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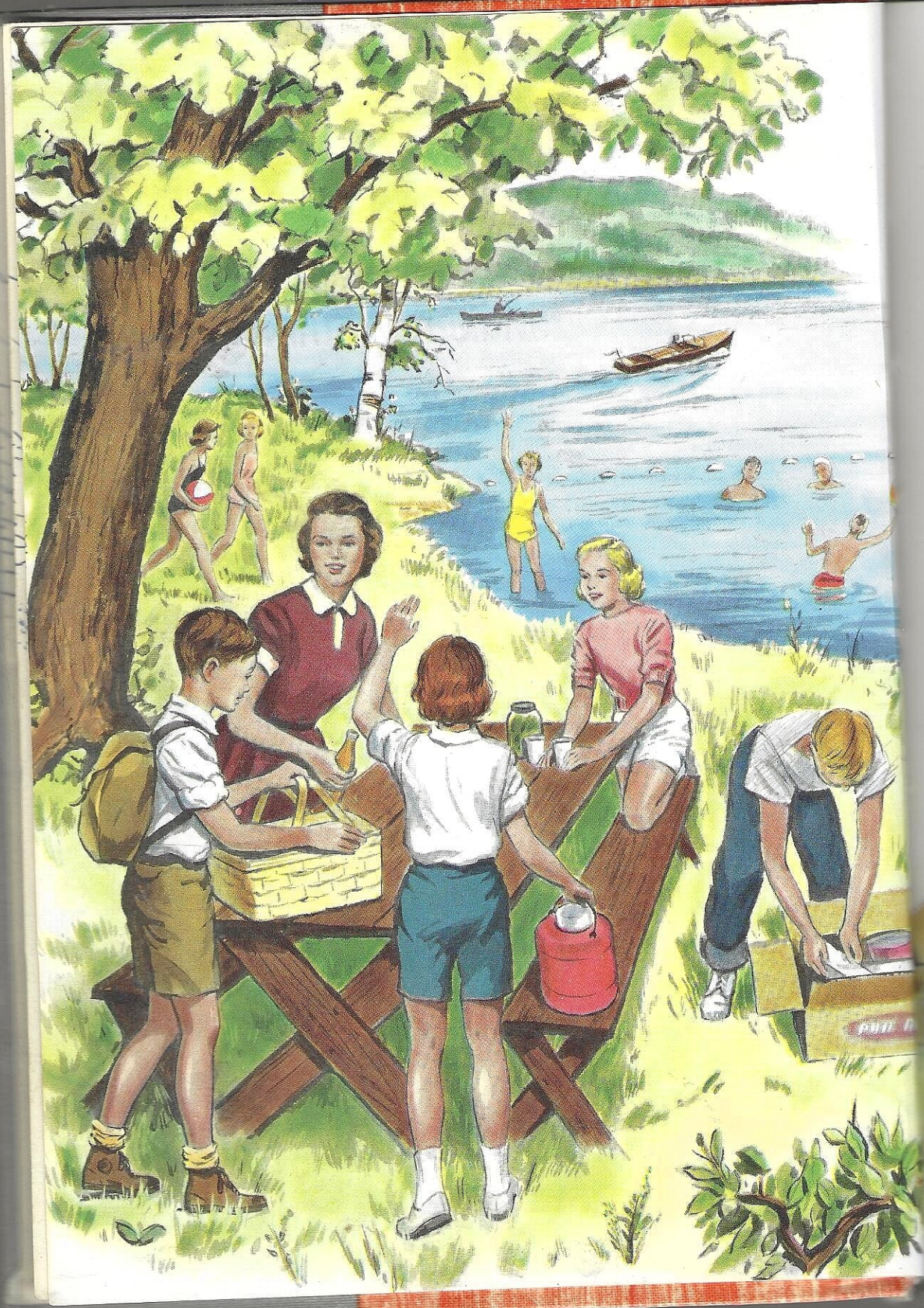
MAKING ARITHMETIC CLEAR



THE WORLD OF NUMBERS

Making Arithmetic Clear

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CHAPTER

1 Understanding and Using Numbers

UNIT 1 UNDERSTANDING NUMBERS

How the News Gets Around

Today we live in a "World of Numbers." This page tells you some facts about sending messages and news. To tell these facts we need to use numbers. To understand the world around us we need to understand numbers. Read these statements and answer the questions.

1. The Pony Express carried mail from Missouri to California over a route nearly 2,000 miles long. This mail service began on April 3, 1860. The cost of sending a $\frac{1}{2}$-ounce letter was $5. There were 80 Pony Express riders and 420 horses used in the service. The Pony Express ended in October, 1861. About how many months had it lasted? What other facts about the Pony Express are given?

2. Today, helicopter air services carry millions of pounds of mail to and from places in and near some of our big cities. Transferring the mail by helicopter service sometimes saves 24 hours. What is another way of saying "24 hours"?

3. The first telegraph message was sent in this country in the year 1844. Was this more, or less, than a century ago?

4. The first telephone conversation in this country took place in 1876. Today, on the average, there are 148,082,000 daily telephone conversations in the United States. To the nearest million, what would this number be?

5. In 1944, there were 57,000,000 radio sets in use in the United States. Ten years later, there were 127,000,000 radio sets in use. How many more million were in use in 1954?

6. In a recent year, there were 33 million television sets in use in this country. How many zeros are needed to write this number using only figures?

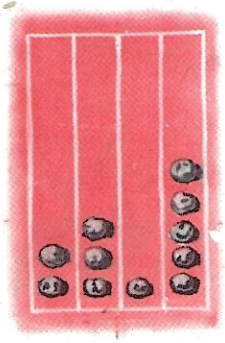
7. How many different ways of sending messages and news did you read about on this page? Do you see now that to find out about our world we need to understand and to use numbers?

The History of Counting

People who lived many thousands of years ago could not count as we do today because numbers had not been invented.

One way early man counted was by matching one thing with some other thing. For instance, a man might count his sheep by using pebbles. As a shepherd drove his sheep out to pasture, he placed a pebble on the ground for each sheep until he had as many pebbles in a pile as he had sheep. When he returned home with his sheep, he would remove one pebble from the pile for each sheep. How could he tell whether all his sheep had returned?

Some early people counted by making marks on the ground. Some cut notches on sticks to help them keep track of things.



In time, the **abacus** was invented. This invention was a better way of counting. There were different forms of the abacus. One form was a wooden frame with counters on wires. Another form was just a series of lines drawn in columns on a table. Pebbles were placed in the columns to show a number. The first column on the right showed ones; the second, tens; the third, hundreds, and so on.

No more than nine pebbles were ever placed in any one column. Can you tell where a tenth pebble would be placed? What number is shown on the abacus in the picture? Forms of the abacus are still used in some parts of the world today.

1. Robinson Crusoe cut one notch in a pole for each day he spent on his desert island. Show, by a drawing, how notches in a stick could show one week.

2. Show how a child in earliest times may have counted nine sheep by making marks on the bare ground.

3. Draw a picture of an abacus like the one shown. Draw pebbles on the picture to show the number of pupils in your class.

★4. Find out more about the abacus and how it is used.

★5. Bring an abacus to class and show how to use it.

Counting to Find How Many

Sometimes we count one at a time to find how many. We can also count by two or more at a time if we wish.

When Martin's class went to the library on Tuesday, Martin counted the girls and boys by two's as they went in. He counted two, four, six, eight, and so on. He found that thirty-two pupils had come to the library.

On the Fourth of July, Martin's father took him to see the parade. The men in the parade marched in rows of fours. Martin counted the men in one section by fours. He found that there were 48 men in that section.

1. Count as Martin counted, from 4 to 48 by 4's.
2. Beginning with 3, count by 3's to 30.
3. Beginning with 6, count by 6's to 60.
4. Beginning with 7, count by 7's to 70.
5. Beginning with 8, count by 8's to 80.
6. Beginning with 9, count by 9's to 90.
7. Beginning with 25, count by 25's to 200.
8. What things are grouped or counted as a "couple"? A "pair"?

★9. Abraham Lincoln began a speech with the words, "Four score and seven years ago . . .". This is another way of saying, "Eighty-seven years ago." How many years are equal to a score?

★10. Beginning with $\frac{1}{2}$, count by $\frac{1}{2}$'s to $3\frac{1}{2}$.

We Use Numbers Every Day

1. If your family has an automobile, write its license number. Write your telephone number; the school telephone number.
2. If your father has a social security number, find out what it is.
3. In what ways have you used numbers at home? In playing games? When buying something?
4. Write the date of your birth. Write your age.
5. What are some things you could not do if you did not know any numbers?

Our Number System

What figures do we use to write the numbers from 1 to 9? What other figure do we need to use to write the number that comes after 9?

1. Study Examples **A**, **B**, and **C**. How many ones make 1 ten?

2. In Example **B**, how many tens make 100?

3. In Example **A**, how many hundreds make 1000?

4. How many ones are there in 1 ten? Tens in 1 hundred? Hundreds in 1 thousand?

5. How many times 1 is 10? How many times 10 is 100? How many times 100 is 1000?

A	B	C
100	10	1
100	10	1
100	10	1
100	10	1
100	10	1
100	10	1
100	10	1
100	10	1
100	10	1
100	10	1
1000	100	10

Our number system is called a **decimal number system** because each place has **ten times** the value of the next place at the right.

thousands	hundreds	tens	ones
			1
		1	0
	1	0	0
1	0	0	0

10 means 10 ones, or 1 ten
100 means 100 ones, or ten tens, or 1 hundred
1000 means 1000 ones, or 100 tens, or 10 hundreds or 1 thousand

6. Tell the place value of each figure in the number 5280.

7. Tell what figure stands for tens in each of these numbers: 48; 300; 1070.

8. Read these numbers aloud: 304; 6000; 7205; 500; 9074.

9. Write these numbers, using figures: ten ones; thirty ones; ten tens; ten hundreds; twenty tens.

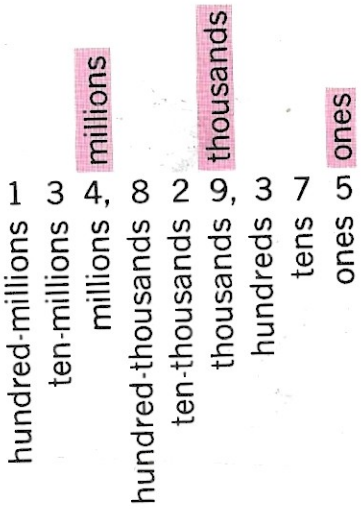
10. *a.* $50 = 5$ __?__. *b.* $200 = 200$ __?__.
c. $4000 = 40$ __?__.

11. How many times as large as 7 is 70?

thousands	hundreds	tens	ones
			0
		8	0
	2	0	0
5	0	0	0
5	2	8	0

Reading and Writing Large Numbers

The diagram at the right shows the place value of each figure in a nine-place number. Notice that the number is divided into groups of three figures by commas. What is the name of each group?



The number is read, "One hundred thirty-four million, eight hundred twenty-nine thousand, three hundred seventy-five." We do not use "and" between any of the words.

We use commas to divide large numbers into groups of three figures, beginning at the right. This helps us to read such numbers.

Read the following numbers aloud:

1.	75,250	10,090	164,000	208,100	400,200
2.	10,001	2,345,208	30,040,500	72,003,000	501,000,000

A comma may or may not be used to separate a four-place number into groups. For example, we may write 5,280 or 5280. The number 5280 may be read: **five thousand two hundred eighty** or **fifty-two hundred eighty.**

The year in a date is written without a comma. We read 1492: **fourteen hundred ninety-two** or **fourteen ninety-two.**

Copy these numbers and write commas in the correct places.

	a	*b*	*c*	*d*	*e*
3.	6510	10000	15370	127030	600400
4.	100000	4308700	58075900	245728430	400030100

5. Write the numbers in Exercise **3**, using words.

Write the following numbers, using figures:

6. *a.* Sixty-one hundred eighteen *b.* Twelve thousand, three hundred fifty *c.* Fifteen hundred six
7. *a.* Twenty thousand, forty *b.* One hundred five thousand
8. *a.* Three million *b.* One hundred million, one thousand

Rounding Off to the Nearest Ten

Mrs. Wilson saw a coat in Brown's Store. She hurried home and told her husband, "It's a fine coat and costs only $40!"

"Mother," said Louise, "I thought it was marked $39 in the window."

"That may be," replied Mr. Wilson, "but Mother was speaking in round numbers. You see $39 is nearer $40 than $30. In round numbers the coat costs $40."

Mrs. Wilson had rounded off $39 to the nearest $10. When 39 is rounded off to the nearest ten, it becomes 40.

Numbers that are rounded off are easier to use and understand.

1. Count by 10's to 100, beginning 10, 20, 30.

2. *a.* Is 63 nearer to 60 or to 70? *b.* Is 67 nearer to 60 or to 70? *c.* What number is halfway between 60 and 70?

When 67 is rounded off to the nearest ten, it becomes 70. Why?

The number 65 is halfway between 60 and 70. When a number such as 65 is rounded off to the nearest ten, we write it as the next higher ten. 65 rounded off to the nearest ten is 70.

3. Round off the price of the other coat in the picture above.

Round off each of the following numbers to the nearest ten:

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*
4.	64	68	19	22	75	57	31	45	98
5.	88	108	189	225	369	548	298	1644	1201

6. Write all the whole numbers that will round off to 50.

★7. Jack said that he was driving about 50 miles an hour. *a.* Was Jack driving exactly 50 miles an hour? *b.* Jack's car was probably going faster than __?__ and slower than __?__ miles an hour.

★8. Linda and her parents planned to drive to Lake Champlain. The distance from their home to the lake was about 90 miles. If they drove 42 miles the first hour, about how many miles remained to go? Round off your answer to the nearest 10 miles.

Rounding Off to the Nearest Hundred and Thousand

George Nelson went with his father by train from Chicago to Detroit. George asked his father how far it is from Chicago to Detroit. His father said, "About 3 hundred miles." "But I mean exactly how far", George answered. His father replied, "The conductor told me it is 283 miles by train from Chicago to Detroit."

"But you see", Mr. Johnson continued, "We may round off 283 to the nearest hundred. That is why I said that the distance we are going is about 3 hundred miles."

1. *a.* Is 327 nearer to 300 or 400? *b.* Is 382 nearer to 300 or 400? *c.* What number is halfway between 300 and 400?

When 327 is rounded off to the nearest hundred, it becomes 300 because it is nearer 300 than 400.

Now round off 382 to the nearest hundred.

The number 350 is halfway between 300 and 400. When a number such as 350 is rounded off to the nearest hundred, we write it as the next higher hundred. The number 350 rounded off to the nearest hundred is 400.

Round off each of these numbers to the nearest hundred:

	a	*b*	*c*	*d*	*e*	*f*	*g*
2.	772	563	914	550	1452	1621	1975
3.	610	546	893	1870	2040	12,499	9,950

4. *a.* What is the smallest number that should be rounded off to 800, when rounding off to the nearest hundred? *b.* The largest?

5. Round off 4852 to the nearest thousand. Is 4852 nearer to 4000 or 5000? Then what should your answer be?

6. What number is halfway between 5000 and 6000?

7. Round off each of these numbers to the nearest 1000:
a. 6235 *b.* 6752 *c.* 3500 *d.* 18,070 *e.* 119,500 *f.* 99,900

8. *a.* A truck weighs 4716 pounds. Round off the weight of the truck to the nearest hundred pounds. *b.* To the nearest thousand.

9. *a.* Round off 17,847 to the nearest hundred. *b.* To the nearest thousand.

10. Round off $14.87 to the nearest dollar.

Another Kind of Counting

Counting also helps us to find the position of something. For example, an usher might say, "Take the sixth seat in the fourth row."

1. Nancy was the fifth girl from one end of a line of girls on a playground. She was also in the middle of the line. How many girls were in the line all together? Which girl is Nancy?

2. What pupil is sitting in the third seat from the front in the second row from the door in your classroom?

3. What number word tells which base Bill reached when he hit a 3-bagger?

4. If you are the twenty-fourth person from the ticket window at a theater, what is the number of the third person behind you? Of the fifth person in front of you?

An Arithmetic Spelling Lesson

For review purposes, keep an arithmetic notebook. Copy the following words neatly in it. Study them until you can spell each word correctly when the teacher pronounces it.

1. eleven	twenty-four	counting	figure
2. twelve	thirty-two	fourth	number
3. thirteen	forty-six	fifth	thousand
4. fourteen	fifty-five	seventh	decimal
5. fifteen	sixty-nine	eighth	million
6. sixteen	seventy-one	ninth	nearest
7. seventeen	eighty-four	twelfth	round off
8. eighteen	ninety-nine	nineteenth	position
9. nineteen	hundred	twenty-second	arithmetic

10. Use each word in Rows 2, 4, and 8 in a sentence.

Review of Unit 1

1. Jim scored the fifth highest in a jumping contest. If there were 8 boys in the contest, how many boys had a higher score than Jim?

2. A schoolroom had nine rows of seats with seven seats in each row. Count the seats in this room by 7's.

3. *a.* In the number 41,728, what figure is in thousands' place? *b.* In hundreds' place? *c.* In ten-thousands' place?

4. Write these numbers, using figures: *a.* Thirty-two ones *b.* Sixty ones *c.* Eighty tens *d.* Twelve hundreds

5. How many times as large as 4 is 40? 400?

6. Which is largest: 4000; 3900; 10,000; 9,999?

7. Use figures to write eighteen thousand, sixty.

8. *a.* Use words to write 1776. *b.* 30,500 *c.* 4,206,000.

9. Round off these numbers to the nearest ten:
a. \$52 *b.* \$65 *c.* 73 *d.* 82 *e.* 21 *f.* 17

10. Round off these numbers to the nearest hundred:
a. 575 *b.* 917 *c.* 487 *d.* 690 *e.* 2519

11. Round off these numbers to the nearest thousand:
a. 6872 *b.* 7500 *c.* 1872 *d.* 13,750 *e.* 52,698

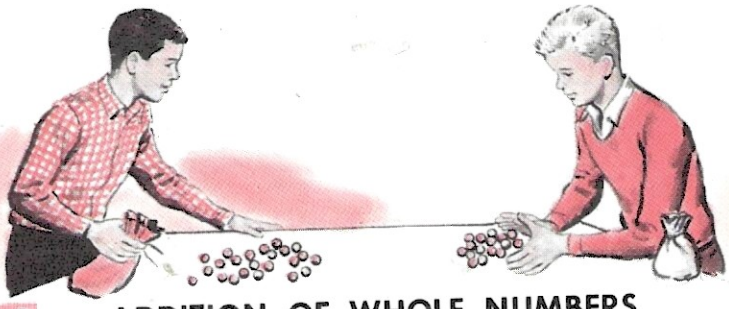
Copy and complete the following statements:

12. Our number system is called a __?__ number system. In the number 7468 the 8 is in __s' place; the 6 is in __s' place; the 4 is in __s' place; and the 7 is in __s' place.

13. It is easier to use and understand numbers that are __?__ numbers.

14. Copy these numbers and place commas in the correct places:

a	*b*	*c*	*d*
200000	17352	560732	6435807
1000000	75014921	1673082	209265184



UNIT 2 ADDITION OF WHOLE NUMBERS

The Meaning of Addition

We often need to find the answer to the question, "How many are there all together?" For example, you might ask, "How many marbles do I have, if I had 23 and Jimmy gave me 16 more?"

1. One way of finding the answer to such a question is by counting. Count to find the answer to the question above.

An easier way of finding "How many are there all together?" is by adding. Addition will help you find the answer to such a question quickly and easily.

2. Now use addition to find the answer to the question above.

3. Tell or write an addition problem of your own.

▶ The numbers that we add are called **addends.** The answer to an addition example is called the **sum,** or **total.**

4. Did the sum in your problem stand for the same kind of things as the addends, or the things you added?

5. Does the sum in any addition example always stand for the same kind of things as the addends?

We may write an addition example in two ways:

$$24 + 12 = 36$$

$$\begin{array}{r} 24 \text{ addend} \\ +\ 12 \text{ addend} \\ \hline 36 \text{ sum} \end{array}$$

This example may be read, "Twenty-four plus twelve equals thirty-six." What sign stands for the word **plus,** or tells you to add?

Help Yourself to Add

Building on ten helps you remember the more difficult addition facts. For example, if you remember that $4 + 6 = 10$, you will know that $4 + 7 = 11$ because $4 + 7$ is 1 more than $4 + 6$.

Copy these examples and write the answers:

	a	*b*	*c*	*d*	*e*	*f*
1.	$8 + 2$	$8 + 3$	$9 + 2$	$3 + 7$	$4 + 7$	$3 + 8$
2.	$6 + 4$	$6 + 5$	$7 + 4$	$5 + 5$	$5 + 6$	$6 + 5$
3.	$1 + 9$	$2 + 9$	$9 + 2$	$2 + 8$	$3 + 8$	$8 + 3$

4. $7 + 5$ equals how much more than $7 + 3$?

5.	$7 + 5$	$8 + 4$	$3 + 9$	$5 + 7$	$4 + 8$	$7 + 6$

The 9's are easy if you think of 9 as 1 less than 10.

6.	$9 + 1$	$2 + 9$	$5 + 9$	$9 + 4$	$6 + 9$	$9 + 3$
7.	$7 + 9$	$9 + 8$	$9 + 9$	$9 + 6$	$8 + 9$	$9 + 7$

The doubles help us remember more difficult facts.

8.	$4 + 4 \longrightarrow 4 + 5$	$5 + 5 \longrightarrow 5 + 6$	$7 + 7 \longrightarrow 8 + 7$
9.	$6 + 6 \longrightarrow 6 + 7$	$8 + 8 \longrightarrow 8 + 9$	$9 + 9 \longrightarrow 9 + 8$

▶ Adding 1 gives us 1 more. Adding 0 gives us no more.

10.	$6 + 1$	$1 + 5$	$3 + 0$	$1 + 1$	$0 + 7$	$1 + 0$	$0 + 0$

If you know these facts, adding larger numbers is easy.

11.	$2 + 7$	$12 + 7$	$32 + 7$	$4 + 5$	$14 + 5$	$24 + 5$
12.	$3 + 0$	$13 + 0$	$23 + 0$	$1 + 0$	$11 + 0$	$21 + 0$
13.	$6 + 4$	$16 + 4$	$36 + 4$	$3 + 7$	$13 + 7$	$33 + 7$
14.	$8 + 4$	$18 + 4$	$28 + 4$	$9 + 3$	$19 + 3$	$29 + 3$
15.	$6 + 7$	$16 + 7$	$36 + 7$	$4 + 9$	$14 + 9$	$24 + 9$
16.	$3 + 8$	$13 + 8$	$33 + 8$	$7 + 6$	$17 + 6$	$27 + 6$
17.	$6 + 9$	$16 + 9$	$26 + 9$	$8 + 5$	$18 + 5$	$28 + 5$
18.	$9 + 2$	$19 + 2$	$29 + 2$	$8 + 9$	$18 + 9$	$38 + 9$
19.	$7 + 9$	$17 + 9$	$37 + 9$	$5 + 9$	$15 + 9$	$45 + 9$

20. *a.* $4 + 6 + 5$ *b.* $7 + 9 + 8$ *c.* $6 + 9 + 8 + 7$

The Language of Addition

Addition examples may be written in different ways, like the examples below. Read them and write the answers. Then write an example like each of the examples below, but use different numbers. Give the answers to your examples.

1. $7 + 5 = ?$

2. Add 8 and 7.

3. Find the sum of 16 and 9.

4. Add: 7, 6, 9, 8.

5. Find the total of 5, 8, and 10.

6.
$$\begin{array}{r} 16 \\ +\ 12 \\ \hline \end{array}$$

7. Add:
$$\begin{array}{r} 24 \\ 32 \\ \hline \end{array}$$

8. Add 4 inches and 7 inches.

9. Nine plus eight equals how much?

10. Seven eggs added to six eggs are how many in all?

11. How much is 6¢, 8¢, and 10¢ all together?

12. What number is 7 larger than 9?

13. How much is 10 more than 12?

14. Sixteen is four less than what number?

How Well Can You Add?

	a	*b*	*c*	*d*	*e*
1.	$8 + 1$	$4 + 5$	$6 + 4$	$6 + 5$	$7 + 6$
2.	$5 + 8$	$7 + 9$	$9 + 0$	$27 + 8$	$24 + 12$
3.	$7 + 8 + 9$	$240 + 35$	$400 + 1600$	$50 + 200 + 5$	$16 + 8 + 9$
4.	89 56	798 896	395 4740	78 2340	2007 8093
5.	6 8 5 7	7 9 6 5 8	96 78 54 69 78	50 306 7 80 1200	647 865 492 905 140

6. Add: four dollars; twelve dollars and sixteen cents; seventy cents; eight cents; ten dollars.

7. *a.* $4000 + 1400 + 10{,}000$ *b.* $401{,}000 + 3{,}060{,}000$

Column Addition

A good method helps you do your work. A good method of addition is shown here. Study this method and then use it in working the examples below.

Think the totals as you add down. *Write the sum. Check by adding* up. Think the totals as you add up. If the two results do not check, repeat the addition.

Think:		**Check**
	7 ↑	twenty-five
twelve	5	eighteen
sixteen	4	thirteen
twenty-five ↓	9	
	25	

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*
1.	1	1	2	4	3	5	5	4	7
	3	4	2	2	4	2	3	5	0
	2	4	3	3	1	2	2	1	3
2.	5	7	3	8	6	9	8	7	8
	6	4	9	5	7	7	9	8	9
	3	6	7	4	5	2	3	5	7
3.	2	3	4	5	3	4	5	6	7
	9	8	7	6	9	8	7	5	9
	3	4	3	3	3	3	3	4	6
4.	9	8	5	7	6	8	8	6	9
	3	4	8	6	7	7	9	9	0
	9	9	9	9	8	6	5	8	9
	6	8	8	9	7	9	8	9	8
5.	4	6	3	9	6	0	4	9	5
	1	9	3	2	3	3	9	5	7
	5	4	5	5	9	9	3	4	7
	9	8	9	6	0	7	8	7	6
	3	3	6	4	7	8	6	6	9
					8	5	8	9	8

Carrying in Addition

Harry knows that 5 ones and 9 ones are 14 ones, but he does not know whether to write the 1 or the 4 in the ones' column. Can you help him? Copy the example and complete it for Harry.

A
$$\begin{array}{r} 75 \\ 89 \\ \hline ? \end{array}$$

Think: 14 ones are 1 ten and 4 ones. Harry should write the 4 in the ones' column and **carry** the 1 ten to the tens' column. Then he should add the tens' column. There are 16 tens. He should write the 6 in tens' column and the 1 in hundreds' place at the left of tens' place.

$$\begin{array}{r} {\scriptstyle 1} \\ 75 \\ 89 \\ \hline 4 \end{array}$$

What is the answer to Harry's example?

Copy Example **B.** Add the ones. What figure should you write in the ones' column under the 7? What figure should you carry to the tens' column? Add the tens. What figure should you write in the tens' column? What figure should you carry to the hundreds' column? Add the hundreds. There are how many hundreds? Where should you write each figure of the hundreds? What is your answer?

B
$$\begin{array}{r} 346 \\ 578 \\ 437 \\ \hline ???? \end{array}$$

Copy the following examples and add. Be sure to keep your figures in straight columns. Do not write the figure you carry if you can remember it. Check your work.

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*
1.	136	76	28	37	98	39	47	2670
	24	43	15	24	52	7	53	280
2.	289	205	291	270	180	648	977	720
	108	108	156	150	20	553	23	8600
3.	568	939	250	870	500	10	4090	48
	177	859	306	50	60	100	10	670
	247	387	145	7	890	1000	1000	4500

4. $85 + 749 + 3600 + 90$ **5.** $3025 + 96 + 150 + 4800 + 19$

Reading, Writing, and Adding Money Numbers

After Mrs. Brown had bought shoes for each of her three children, she added to find out how much she had spent.

A **decimal point** is written to the left of the two places for cents. The decimal point is placed between the figures for dollars and the figures for cents.

Mrs. Brown wrote a dollar sign to the left of the first addend and to the left of the total. Check her addition.

1. Read the amount of each purchase and the total.

2. Write these amounts, using words:

a. $2.79 *b.* $3.06 *c.* $.95 *d.* $.50 *e.* $10.00 *f.* $.25

Write the following numbers, using figures. Put the decimal point and the dollar sign in their correct places.

	a	*b*
3.	one dollar and ninety cents	forty-five cents
4.	four dollars and five cents	two cents
5.	one hundred dollars and eighteen cents	one hundred dollars
6.	five thousand, five hundred dollars	one hundred cents

Copy these examples and add. Be sure to write the dollars and the cents in their correct places.

	a	*b*	*c*	*d*	*e*	*f*
7.	$2.15	$1.66	$1.50	$2.05	$2.51	$.07
	1.12	3.52	.25	.40	1.06	.09
	3.25	2.24	2.08	.30	.43	.04

	a	*b*	*c*	*d*
8.	$ .50	$ 5.49	$96.48	$ 500.00
	.03	10.69	.68	3000.00
	.49	.19	4.04	42.00
	1.00	5.00	10.00	1.10

9. *a.* Add: $3.00, $300, 30 cents, $3000, $.03. *b.* forty cents, fourteen cents, four cents, four dollars.

Adding Larger Numbers

Mabel Smith lives in the rapidly growing city of Winsted. She wished to make a report to her social studies class on the growth of their city. She obtained the information at the city clerk's office.

	Population
1950 census	206,093
Growth since 1950	80,407
Present Population	286,500

Write the answers to these three questions in words.

1. What was the population of Winsted in 1950?
2. What has been the growth in population since 1950?
3. What is the population at the present time?

▶ When you add, keep your figures in straight columns. Be sure to add ones to ones, tens to tens, hundreds to hundreds, and so on.

Read the numbers in the following examples aloud. Then copy the examples and add. Check your work.

	a	*b*	*c*	*d*
4.	59,688	425,960	4,083,200	100,750,000
	86,714	70,801	670,800	20,090,000

5. 17,020 + 210,900 + 843,000 + 2,035,100

Sometimes we round off large numbers before we add them. We do this when we do not need to know the exact sum. All we need to know in such examples is "about how many."

6. In a recent year, Honduras shipped 12,637,000 bunches of bananas to our country, Mexico shipped 6,382,000 bunches, and Guatemala shipped 6,067,000 bunches. About how many million bunches did the United States buy from all three countries? To answer this question we round off the numbers.

a. Round off each number to the nearest hundred-thousand. In the number 12,637,000, is the 637,000 nearer to 600,000 or 700,000?

b. Add the rounded numbers.

c. Round off the sum to the nearest million. What is your answer to the question in the problem?

Having a Party

Ted and Sue gave a Halloween Party. To get ready for the party they had to solve some problems. Here are some of their problems.

1. Ted and Sue each made a list of the names of the friends they were inviting to the party. Ted had 9 names on his list. Sue had 12 on her list. Sue said, "There will be 21 children at the party." Ted said, "No, there will be 23 children all together." Why did Ted add 2 more in finding his total?

2. Sue spent 25¢ for candles, 39¢ for paper plates, 17¢ for paper napkins, and 34¢ for paper cups. How much did she spend all together?

3. Sue's mother made cupcakes. Sue put white frosting on 9 of the cakes, orange frosting on 23, and chocolate frosting on 16. What was the total number of cupcakes Sue frosted?

4. Ted spent 96¢ of his own money for favors. His mother gave him 75¢ more to buy paper caps, and $2.80 to pay for the ice cream. How much money did Ted spend all together?

5. Some of the children at the party played a dart game. Here are the three highest scores: Jack scored 3, 5, 0, 7, and 8. *Henry* scored 4, 6, 2, 7, and 9. *Bill* scored 6, 3, 0, 9, and 8. What was each boy's total score?

Adding Across the Page

It is not always necessary to write numbers in a column in order to add them. Sometimes we add across, as in this example.

To add this example begin at the left and think the totals as you go to the right. Then check your answer by thinking the totals from right to left.

$7+4+8+6=?$

Write the answers only to these examples:

	a	*b*
1.	$6+8+5+3$	$8+3+5+1+9+6$
2.	$4+9+0+7+2$	$7+0+6+3+4+7+2$
3.	$8+3+6+9+4$	$8+5+9+4+7+6+3$
4.	$7+12+4+10$	$9+16+8+20+6+25$

Review of Unit 2

1. $4+6$ $\quad 7+5$ $\quad 8+9$ $\quad 1+0$ $\quad 13+1$ $\quad 18+10$
2. $37+8$ $\quad 36+12$ $\quad 9+6+8$ $\quad 400+1600$ $\quad 320+25$ $\quad 50+200+5$

Copy and add:

	a	*b*	*c*	*d*	*e*	*f*
3.	246	79	897	695	72	5007
	32	56	986	8730	6480	8093
4.	8	6	69	40	467	$2.40
	6	7	78	306	865	.68
	5	9	45	7	492	4.06
	7	5	96	80	904	15.00
		8	87	1200	150	1.10

5. 80 cents + $2.00 + 6 cents + 3 dollars

6. Add: ten dollars; eleven dollars and twenty-six cents; ninety cents; three dollars and seven cents.

7. *a*. $5000 + 1200 + 10{,}000$ $\quad$ *b*. $601{,}000 + 2{,}070{,}000$

8. Round off the following numbers to the nearest hundred. Then add the rounded numbers and round off their sum to the nearest thousand. $\quad 4610 \quad 19{,}560 \quad 99{,}890$

9. Nancy has $10.00. Does she have enough money to buy a skirt for $4.25, a blouse for $3.78, and sandals for $2.59?

UNIT 3 SUBTRACTION OF WHOLE NUMBERS

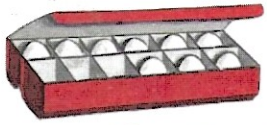
The Meaning of Subtraction

What is the difference?

Bob made 16 points in the dart game. Alec made only 10 points. What is the difference between 16 and 10?

$16 - 10 = 6$

How many are left?



$12 - 3 = 9$

To answer the two questions above, we subtracted.

1. Fred had saved \$5.00 to buy a baseball and glove. He bought a baseball for \$1.98. How much money did he have left after buying the ball?

a. What should we do to find how much is left?

b. How much money did Fred have left?

$$\begin{array}{r} \$5.00 \\ -\ 1.98 \\ \hline \$3.02 \end{array}$$

2. The glove that Fred wanted to buy cost \$3.85. How much more money did Fred need in order to buy the glove?

a. What should you do to find how much more one number is than another? *b.* How much more money did Fred need?

$$\begin{array}{r} \$3.85 \\ -\ 3.02 \\ \hline \$\ .?? \end{array}$$

3. The Wilsons planned to drive 380 miles on the first day of their vacation trip. Because it rained that day they drove only 320 miles. Joe wondered how many fewer miles they drove than they had planned. What should Joe do to find out?

4. Tell or write a problem of your own that asks you to find how much is left.

5. Tell or write a problem that asks you to find the difference between two numbers.

A subtraction example may be written like this: $36 - 12 = 24$. It may also be written as shown at the right.

$$\begin{array}{rl} 36 & \textbf{minuend} \\ -\ 12 & \textbf{subtrahend} \\ \hline 24 & \textbf{remainder, or difference} \end{array}$$

This example may be read, "Thirty-six minus twelve equals twenty-four." What sign stands for the word **minus**, or tells you to subtract?

Help Yourself to Subtract

Addition helps you subtract

Subtraction is easy if you know the addition facts well. For example, if you know that $8 + 4 = 12$, then you should also know that $12 - 4 = 8$, and that $12 - 8 = 4$.

For each pair of related addition facts there is a pair of related subtraction facts. Such a group of related addition and subtraction facts is called a **family.** Study the family for 5, 8, and 13.

$5 + 8 = 13$
$8 + 5 = 13$
$13 - 5 = ?$
$13 - 8 = ?$

Write the family of addition and subtraction facts for each of these pairs of numbers.

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*
1.	3,7	6,4	2,8	4,7	4,5	3,4	7,5	4,9
2.	9,3	8,4	5,5	8,6	3,8	6,9	9,2	8,8
3.	6,6	6,5	8,7	7,9	7,6	7,7	8,9	9,9

Copy these examples and supply the missing numbers:

	a	*b*	*c*	*d*
4.	$8 + ? = 11$	$9 + ? = 14$	$? + 6 = 11$	$5 + ? = 12$
5.	$4 + ? = 10$	$3 + ? = 10$	$? + 9 = 12$	$5 + ? = 13$
6.	$9 + ? = 18$	$? + 6 = 13$	$6 + ? = 15$	$? + 8 = 17$

Subtracting 1 and subtracting 0

▶ Subtracting 1 gives 1 less. Subtracting 0 gives a remainder that is the same as the number from which we subtract.

	a	*b*	*c*	*d*	*e*	*f*
7.	$9 - 1$	$5 - 1$	$8 - 1$	$10 - 1$	$20 - 1$	$1 - 1$
8.	$4 - 0$	$6 - 0$	$3 - 0$	$9 - 0$	$1 - 0$	$0 - 0$

Checking subtraction

In Example **A,** if you add the remainder to the subtrahend, will the sum equal 8?

In Example **B,** check the subtraction by adding 25 and 13. Think: $5 + 3 = 8$, $2 + 1 = 3$.

A	8	**B**	38
	−3		−13
	5		25

The Language of Subtraction

Read these different ways of writing subtraction examples and write the answers. Then write an example like each one of these but with different numbers.

1. 16 minus 7 = ?
2. 13 − 6 = ?
3. Subtract 8 from 17
4. 15 is how much more than 9?
5. 12 is how much less than 20?
6. Subtract: 48 − 12
7. Subtract: 39 − 15
8. 16 is how much smaller than 25?
9. Eleven is four more than what number?
10. What is the difference between 18 and 12?
11. What number is 10 less than 25?
12. What number subtracted from 20 will leave 13?

How Well Can You Subtract?

Copy these examples and subtract:

	a	*b*	*c*	*d*	*e*
1.	8 − 5	7 − 1	4 − 0	9 − 6	10 − 8
2.	11 − 8	13 − 7	17 − 8	15 − 7	19 − 9
3.	67 − 7	46 − 40	38 − 32	61 − 56	90 − 50
4.	56 − 43	487 − 63	345 − 40	800 − 200	1728 − 725
5.	42 − 18	75 − 69	80 − 53	256 − 47	347 − 94
6.	138 − 63	623 − 254	468 − 379	300 − 204	500 − 96
7.	116 − 77	706 − 697	\$1.07 − .09	\$52.16 − 43.47	\$10.00 − 6.98

8. *a*. \$5.00 − 45¢ *b*. 20,000 − 18,090 *c*. 101,400 − 99,500

Changing a Ten or a Hundred When Subtracting

In Example **A**, we can subtract 2 ones from 5 ones, and 3 tens from 7 tens. In Example **B**, we cannot subtract 8 ones from 4 ones. So we must take 1 of the 6 tens and change it to 10 ones.

A	75	**B**	$\overset{5}{\cancel{6}}\,\overset{14}{\cancel{4}}$
	−32		−28
	43		36

Then we add the 10 ones to 4 ones, making 14 ones. Now we can subtract. $14 - 8 = ?$ $5 - 2 = ?$

In Example **C**, we can subtract 4 ones from 9 ones, but we cannot subtract 7 tens from 3 tens. So we take 1 of the 6 hundreds and change it to 10 tens. 10 tens and 3 tens are 13 tens.

$13 - 7 = ?$ $5 - 2 = ?$

C	$\overset{5}{\cancel{6}}\,\overset{13}{\cancel{3}}$	9
	−2	74
	3	65

In Example **D**, we need to change both a ten and a hundred.

How did we get the 12 ones? How did we get the 13 tens?

D	$\overset{8}{\cancel{9}}$	$\overset{13}{\cancel{4}}\,\overset{12}{\cancel{2}}$	
	−5	8	6
	3	5	6

There are no tens in tens' place in Example **E**, but we know that 5 hundreds are the same as 50 tens. So we take 1 ten from the 50 tens leaving 49 tens. One ten and 4 ones are 14 ones. $14 - 7 = ?$ $9 - 3 = ?$ $4 = 1 = ?$

E	$\overset{4}{\cancel{5}}$	$\overset{9}{0}\,\overset{14}{\cancel{4}}$	
	−1	3	7
	3	6	7

▶ When we change a ten to 10 ones, we say that we **borrow** 1 ten. When we change a hundred to 10 tens, we also say that we **borrow** 1 hundred. The 1 ten and the 1 hundred are said to be **borrowed.**

Explain orally each step of the work for the examples in column *a*. Then copy the examples and subtract. Use helping figures only if you need them. Check your work.

	a	*b*	*c*	*d*	*e*	*f*	*g*
1.	57	453	156	417	302	400	814
	48	419	148	409	65	148	253
2.	235	813	160	468	315	800	702
	180	53	70	179	296	530	605

More Difficult Subtraction

Study the examples below until you can explain each step of the work. In Example **A**, we borrow from tens but not from hundreds. Then we borrow from thousands. In Example **B**, we borrow 1 hundred from 20 hundred, leaving 19 hundred. In Example **C**, we borrow from 1000 tens, leaving 999 tens.

A

$$\begin{array}{r} {}^{2}\cancel{3}\,{}^{16}\cancel{6}\,{}^{8}\cancel{9}\,{}^{15}\cancel{5} \\ 1\,7\,7\,8 \\ \hline \end{array}$$

B

$$\begin{array}{r} {}^{1}\cancel{2}\,{}^{9}0\,{}^{10}\cancel{1}\,{}^{10}\cancel{0} \\ 1\,9\,3\,6 \\ \hline \end{array}$$

C

$$\begin{array}{r} {}^{9}\cancel{1}\,{}^{9}0\,{}^{9}0\,{}^{10}\cancel{0} \\ 8\,6\,7 \\ \hline \end{array}$$

Copy these examples and subtract. Write the helping figures if you need them. Check your work.

	a	*b*	*c*	*d*
1.	9551 6653	6183 5284	2800 1938	2000 198
2.	17,813 4,952	44,733 678	309,207 28,701	10,010 9,001

3. *a.* 850,400 − 10,060 *b.* 150,000,000 − 4,068,000

4. Round off 760,460 and 609,750 to the nearest thousand and subtract the smaller number from the larger. Then round off the difference to the nearest ten-thousand.

*5. Find out in what year George Washington was born and in what year he died. Subtract to find how old he was when he died.

*6. How many years has it been since Columbus discovered America?

*7. Look up the population of the United States in the 1950 census and in the 1940 census. Then find the increase in population from 1940 to 1950.

*8. Look up the present population of New York City and Chicago. Round off the numbers to the nearest hundred-thousand and subtract the smaller number from the larger. Round off the difference to the nearest million. *About how many million more persons live* in New York than in Chicago?

Roman Numerals

Today we do most of our number work with Arabic numerals because they are easy to use and understand. The Arabic numerals are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.

About 2000 years ago the Romans developed a number system in which they used some of the letters of the alphabet as numerals. Here is an outline of some interesting facts about the Roman number system.

I. The Roman number system was different from the Arabic system.
   - A. The Roman system had no zero; therefore it could not show place value.
   - B. The Roman number system used letters for numerals.

II. The Romans used the letters I, V, X, L, C, D, and M when writing numbers.

III. Today we sometimes use Roman numerals in these ways:
   - A. As main headings in outlines
   - B. For writing the year
   - C. As chapter numbers
   - D. On sun dials and clock faces
   - E. On cornerstones of buildings
   - F. To show different kings and queens who had the same names: Charles I, Elizabeth II, Henry VIII.

Study the way the letters I, V, X, L, C, D, and M are used to make the following Roman numbers.

I = 1	VIII = 8	XIX = 19	L = 50
II = 2	IX = 9	XX = 20	LX = 60
III = 3	X = 10	XXI = 21	XC = 90
IV = 4	XI = 11	XXIV = 24	C = 100
V = 5	XIV = 14	XXIX = 29	CCC = 300
VI = 6	XV = 15	XXX = 30	D = 500
VII = 7	XVI = 16	XL = 40	M = 1000

▶ **These rules will help you write Roman numbers correctly:**

Repeating a numeral repeats its value. II = 2 III = 3

A numeral placed after a larger numeral is added to it.

V = 5 I = 1 VI = 6 L = 50 X = 10 LX = 60

A numeral placed before a larger numeral is subtracted from it.

I = 1 X = 10 IX = 9 X = 10 L = 50 XL = 40

A numeral placed between two larger numerals is subtracted from the one that follows it.

X = 10 I = 1 V = 5 XIV = 14

X = 10 I = 1 X = 10 XIX = 19

The same letter is not used more than three times in succession, except in the number IV, which may be written IIII.

1. Write the numbers 1 to 50, using Roman numerals.
2. Write your age, using Roman numerals.

Write the following numbers, using Roman numerals:

	a	*b*	*c*	*d*	*e*	*f*	*g*
3.	13	14	29	42	50	69	74
4.	88	92	99	100	101	104	110

Write the following numbers, using Arabic numerals:

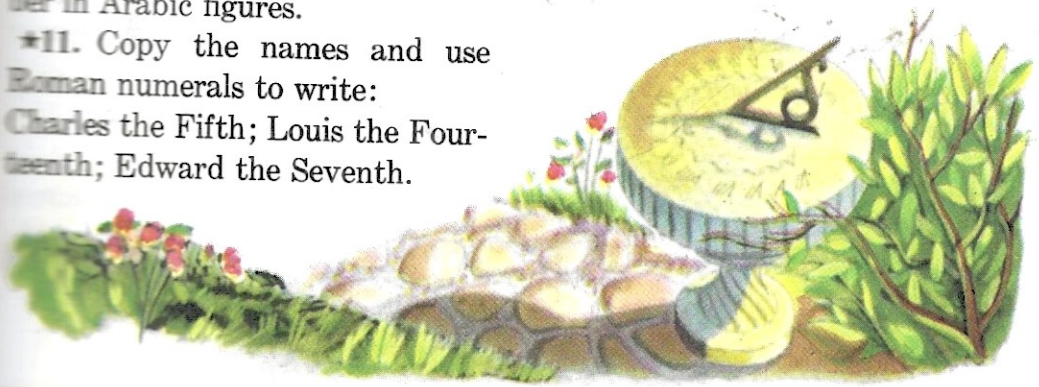
	a	*b*	*c*	*d*	*e*	*f*	*g*
5.	VII	XIX	XII	XIV	XX	XXIX	XLVII
6.	IX	XXI	XVI	XXV	XL	XXVI	DXCIX
7.	LXX	LIX	XC	CXX	CCL	CDXL	MDC

8. What time is shown by the shadow on the sun dial?

*9. Make a sketch of a sun dial, using Roman numerals. Have the shadow falling to show that it is 8 o'clock.

*10. Early Romans wrote this number to show the length of a certain aqueduct: MMMMMMMCCLXXXXI. Write the number in Arabic figures.

*11. Copy the names and use Roman numerals to write: Charles the Fifth; Louis the Fourteenth; Edward the Seventh.



Subtracting Money

George was saving his money to buy a sport jacket. He liked the jacket marked $16.50 very much. He wondered how much more he would need to save to buy the $16.50 jacket than to buy the jacket marked $11.69.

To find how much more $16.50 is than $11.69, George had to subtract.

When we subtract money, we must be sure to place the dollars under dollars and the cents under cents. The decimal points must be in a line, one under another. We borrow just as we do in other subtraction. Explain each step of the example.

$$\begin{array}{r} {\scriptstyle 5\ \ 14\ \ 10} \\ \$1\ \not{6}.\ \not{5}\ \not{0} \\ 1\ 1.\ 6\ 9 \\ \hline \$\ \ 4.\ 8\ 1 \end{array}$$

Copy these examples and subtract. Check your work.

	a	*b*	*c*	*d*	*e*
1.	$.27	$2.61	$2.25	$3.29	$1.04
	.15	1.42	1.32	.45	.10
2.	$5.00	$5.00	$3.04	$2.15	$.43
	.05	1.49	.76	.18	.06
3.	$124.72	$315.96	$910.20	$6821.00	$10,000
	17.46	200.00	34.12	4320.11	7,000

	a	*b*	*c*
4.	$60.00 − $3.28	$30 − $23	$4000 − $3854
5.	$80 − $9.30	$40 − $20.05	$10,000 − $6547.10

6. Subtract eighteen cents from one dollar and fifty cents.

7. Ten dollars less six dollars and seven cents equals how much?

8. Mrs. Clark made a ten-dollar deposit on a vacuum cleaner that cost $69.75. How much more is due on the cleaner?

9. A chair priced at $39.98 was on sale at a saving of $13.45. What was the sale price of the chair?

10. Mr. Bruce bought a new car for $2340.87. He was allowed $675 for his old car. How much did the new car cost Mr. Bruce?

Reading Arithmetic Problems

In order to work an arithmetic problem, you need to read carefully to find out **what the problem asks you to find** and **what facts it tells you.** Then you must decide how to use the facts to find the answer.

Read the following problems aloud. Be sure that you know the meaning of each word. Tell or write the question that the problem asks, and the facts it tells you. Then tell or write how to use the facts to find the answer. The first one is done for you.

1. Ted delivers 124 papers and his friend Joe delivers 115 papers each evening. How many more papers does Ted deliver each evening than Joe delivers?

The problem asks how many more papers Ted delivers each evening than Joe delivers.

The problem tells that Ted delivers 124 papers, and that Joe delivers 115 papers each evening. Since I want to find how many more 124 is than 115, I will subtract 115 from 124.

2. Jerry delivered 49 papers on Monday, 50 on Tuesday, 48 on Wednesday, 53 on Thursday, 52 on Friday, and 60 on Saturday. How many papers did he deliver all together during that time?

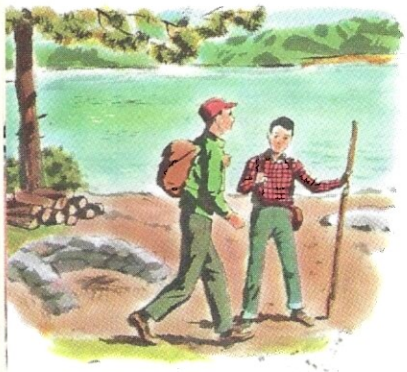
3. Barbara spent 10¢ for pencils, 35¢ for a notebook, and 15¢ for note paper. How much did she spend in all?

4. The wing span of Bill's model plane is 48 inches. The wing span on Ted's plane is 36 inches. The wing span of Bill's plane is how much greater than the wing span on Ted's?

5. Sarah is 62 inches tall and Joan is 57 inches tall. How much shorter is Joan than Sarah?

6. Suppose that you have received $5.00 as a birthday gift from your grandfather. Could you buy a knife for $1.35, a puzzle for 39¢, and a ball and glove for $3.30 with the $5.00?

*7. Make up a problem in which you must use addition and a problem in which you must use subtraction. Write them carefully and be sure that you have spelled the words correctly. Read them to the class and tell how to work them.



Some Problems Have Two Steps

1. Tom and his father were camping at Silver Lake. One day they decided to hike all the way around the lake. They found out that the distance around the lake was 47 miles. They hiked 16 miles the first day and 13 miles the second day.

a. How far did they hike in the first two days?

b. How far will they have to hike to reach camp the third day?

Notice that you needed to find the answer to the first question in order to find the answer to the second question.

Read the facts that are given in the left-hand column below. Tell or write what you need to do to find the answer to each question. Then do the work to find the correct answers.

Facts	Questions
2. Miss Young's class planned to sell 300 tickets to the school carnival. They sold 65 tickets on Monday, 58 on Tuesday, 50 on Wednesday, and 62 on Thursday.	*a.* How many tickets have the pupils sold all together? *b.* How many more tickets must they sell in order to sell all of the 300 tickets?
3. A customer bought 2 cans of corn for \$.39, 2 quarts of milk for \$.48, and 3 bars of soap for \$.19. The customer handed the clerk a 5-dollar bill.	*a.* What was the total cost of the purchases? *b.* How much change should the customer receive?
4. Miss Williams told the school principal that there were 17 boys in her sixth-grade class, and that there were 4 more boys than girls in the class.	*a.* How many girls were there in Miss Williams' class? *b.* How many boys and girls are there all together in Miss Williams' class?

★**5.** Write a problem of your own with two questions, and then solve your problem.

Two Steps But Only One Question

(Help in problem solving)

Read the following problem and then study how Helen solved it.

Louise bought a 10-cent spool of thread, 6 buttons for 48¢, and a roll of tape for 19¢. She handed the clerk one dollar. How much change should she receive?

How Helen Solved the Problem

Think

To find the change that Louise should receive, I first need to find the total cost of the articles she bought. So I must add 10¢, 48¢, and 19¢. Then I will subtract the total from $1.00 to find the change.

Write

$.10
.48
.19
$.77

$1.00
− .77
$ .23 change

Notice that two steps are needed to solve the problem but only one question is asked. Also notice that you need to do the first step before you can find the answer to the question.

Read each of the following two-step problems and tell what you need to do to solve each problem. Then use Helen's work above as a guide and solve each problem.

1. A Scout troop agreed to collect two thousand pounds of old newspapers for a paper drive. They collected 328 pounds the first day, 204 pounds the third day, 581 pounds the fourth day, and 417 pounds the fifth day. How many more pounds had they agreed to collect?

2. Tom and Harry earn money by mowing lawns. Harry earns $.75 an hour. Tom, who is younger than Harry, earns 15 cents an hour less than Harry. How much do they both earn in one hour?

3. Ned received a birthday gift of $5.00. He bought a ball for $.75 and spent $.15 for candy. He put the rest of the $5.00 in his savings bank. How much money did he put in his bank?

4. Write a two-step problem of your own and then solve it.

How Well Can You Solve Problems?

(Problem Test 1)

1. Ann had 29 books in her library. She received 6 more for Christmas. How many books did she have in her library then?

2. Philip weighs 87 pounds. His father weighs 180 pounds. What is the difference in their weights?

3. Dan paid $42.50 for a suit, $1.50 for a tie, $6.35 for a hat, and $3.50 for a shirt. How much did these clothes cost him?

4. Nancy weighed 77 pounds when she entered the sixth grade. By following the nurse's advice about food, rest, sleep, and drinking plenty of milk, Nancy increased her weight 14 pounds during the year. How much did she weigh at the end of the year?

5. Jack and his father went on a vacation. The first day, they traveled 385 miles in their car. The second day, they rode 23 miles on horseback to reach the camp. After camping for eight days, they returned home the same way they had come. How far did they travel all together?

6. How many runs will Kingston High need to make in order to win in the ninth inning?

Inning	1	2	3	4	5	6	7	8	9
Hamilton	0	1	0	0	2	3	0	2	0
Kingston	0	0	1	2	0	0	2	1	

7. The Dalton's family income is $475 each month. Last month their expenses were: rent $85, food $104.50, clothing $68.90, entertainment $24.16, automobile expense $43.71, other expense $35.09. How much money could the Daltons save last month?

8. The Girl Scouts formed two teams to sell cookies. The first week, Team A sold 25 dozen and Team B sold 15 dozen. The second week, Team A sold 23 dozen and Team B sold 15 dozen. Which team was ahead at the end of the second week? How much ahead?

9. Betty's mother gave her $1.50 to buy groceries. Betty was told that she could buy a 10¢ ice-cream bar if there was enough change left from the $1.50. She bought bread for 23¢, milk for 47¢, a dozen eggs for 62¢, and a box of salt for 11¢. Could Betty buy an ice-cream bar?

A New Way to Write Addition and Subtraction Examples

You have learned that sometimes we use a question mark to stand for the answer as in Examples A and B.

A	6 + ? = 14
B	12 − ? = 5
C	6 + N = 14
D	12 − N = 5

Another way to write the same examples is shown in Examples C and D.

We read Example C, "Six plus what number equals 14?" In this example, what number does N stand for?

Read Example D. N stands for what number in Example D?

Find what number N stands for in each of these examples:

	a	*b*	*c*	*d*
1.	10+N=25	N+24=36	18−N=8	N−9=7
2.	24−6=N	9+27=N	N+12=48	32−N=16
3.	50−N=30	N−25=60	72−N=60	N+90=108
4.	12+N=13	10−N=9	N+6=6	8−N=0
5.	N+60=100	N−100=10	78+N=240	1000−N=100

Review of Unit 3

Copy these examples and subtract:

	a	*b*	*c*	*d*	*e*
1.	15 − 8	16 − 7	17 − 9	59 − 50	80 − 60
2.	689 54	900 300	1956 952	52 37	85 79
3.	70 43	574 68	239 75	586 397	400 106
4.	117 88	805 796	$1.06 .07	$41.13 34.58	$10.00 5.69

5. *a.* $8.00 − 65¢ *b.* 30,000 − 19,080 *c.* 101,600 − 99,700

How Much Have You Learned?

(Chapter Test 1)

Oral

1. Jim was the fifth pupil in the third row of seats. Jim was also the middle pupil in his row. How many pupils were in his row?

2. Count the seats in your room by the number of seats there are in each row.

3. Tell the place value of each figure in the number 30,641.

4. Read these numbers and then tell which is the largest, and which is the smallest. 3000; 2900; 10,000; 9,999; 200,600.

5. How many times as large as 6 is 60? 600?

6. Round off 195 to the nearest 10. To the nearest hundred.

7. Make up a problem in which you must add 8 and 12.

8. What do you borrow when subtracting 18 from 142?

9. Read these Roman numbers: IX XXVI XIV XLV CCL

10. $0 + 0$ $9 + 8$ $5 + 7$ $6 + 9$ $18 + 7$ $20 + 6$

Written

1. Count by 6's from 6 to 60.

2. In the number 505, the 5 at the left means how many times as much as the 5 at the right?

3. Write the number, 30 hundreds, in figures.

4. Write these numbers in figures: *a.* one hundred ninety *b.* twelve thousand, sixty *c.* one hundred two thousand.

	a	*b*	*c*	*d*	*e*
5.	79 + 456	365 − 60	1956 − 952	897 + 689	56 + 7280
6.	6004 + 8096	75 − 69	463 − 59	159 − 75	374 − 279

7. 6
7
5
8
9

8. 70
403
9
40
3500

9. 704
− 696

10. \$7.00 − 95¢

11. \$10 − \$4.39

12. 30,000 − 9,080

13. Find N: *a.* $36-N=7$ *b.* $N+140=175$ *c.* $124-100=N$

14. Write the answer only: $8+5+3+7+4+9+6+2$

15. 70 cents + \$3.00 + 8 cents + 5 dollars + 1 dollar and 2¢.

16. *a.* $6000+101+10{,}000$ *b.* $101{,}400-99{,}600$

17. There are 393 boys and 425 girls at the Wilson School. How many more girls than boys are there in this school?

18. The cashier in the school lunchroom collected \$29.76 on Monday, \$32.40 on Tuesday, \$30.65 on Wednesday, \$28.09 on Thursday, and \$40.90 on Friday. How much did he collect for the week?

19. Jim and Jerry are saving their money to buy a set of boxing gloves that cost \$10.00. Jim has saved \$2.18 and Jerry has saved \$3.06. How much more do they need to save together?

Decide for Yourself

(Enrichment)

1. Joe made a mistake when he was copying an addition example and wrote 654 instead of 645. If he added correctly, was his answer larger or smaller than the correct answer? How much larger or smaller was it?

2. Is the difference between 1200 and 999 larger or smaller than 200?

3. If 349 is subtracted from 1258, the remainder is 909. How much is 1258 minus 909?

4. Mr. Hanson paid \$3.90 for a shirt. He gave the clerk a twenty-dollar bill. The clerk gave Mr. Hanson 10¢ and four bills as change. What were the bills?

5. Tom earned 40¢. His father gave him 75¢ more. After Tom bought a game, he had 65¢ left. What did the game cost?

6. In 1940, the population of Washington, D. C., was 663,091. Ten years later, the population had increased 139,087. Round these numbers to the nearest thousand. About what was the population in 1950? If you rounded your answer to the nearest hundred-thousand, what number would you get?

CHAPTER

2 Multiplication and Division of Whole Numbers

Meaning of Multiplication

The picture on the opposite page shows the cookies that Anne baked for her mother. Anne has placed the cookies on the table in 4 rows. There are 12 cookies in each row. How many cookies are there all together?

We can find the answer by addition or by multiplication.

Addition		Multiplication	
First add the ones.	12	Four 2's are 8. Write	12
Then add the tens.	12	8 in ones' place.	$\times 4$
What is the sum?	12	Four 1's are 4. Write	48
	12	4 in tens' place.	
	48	What is the product?	

1. Is the answer the same for both the addition and the multiplication example?
2. Was addition or multiplication the faster way to find the answer?

Multiplication is a short way of finding the total of two or more equal numbers.

Find the answer to each of these examples first by addition and then by multiplication:

	a	*b*	*c*	*d*	*e*
3.	Three 7's	Six 2's	Seven 5's	Three 6's	Four 7's
4.	Four 8's	Two 9's	Six 6's	Three 8's	Three 9's

The example **five times six equals thirty** may be written: $5 \times 6 = 30$.

It means that five 6's equal 30.

This example may also be written as shown at the right. What sign tells you to multiply?

6	**multiplicand**
$\times 5$	**multiplier**
30	**product**

- The **multiplicand** is the number that is multiplied.
- The **multiplier** is the number by which we multipy.
- The **product** is the answer that we get when we multiply one number by another.

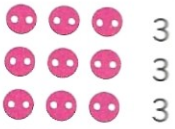
Helps in Multiplication

4
4
4
three 4's = 12

Study the rows of buttons.

1. Three 4's means 3×4. What does four 3's mean?

2. Is the product of 3×4 the same as the product of 4×3?



3
3
3
3
four 3's = 12

3. Make a picture to show $5 \times 10¢$.

4. Now make a picture to show $10 \times 5¢$.

5. Is the product of 5×10 the same as the product of 10×5?

6. Write two multiplication examples for each of the following pairs of numbers.

a. 2,4 *b.* 5,4 *c.* 2,5 *d.* 6,2 *e.* 1,4 *f.* 3,0

7. 6×1 means six 1's. What does 1×6 mean?

8. *a.* $2 \times 1 = ?$ *b.* $1 \times 8 = ?$ *c.* $1 \times 1 = ?$ *d.* $1 \times 0 = ?$

▶ The product of any number and 1 is the same as that number.

9. 4×0 means four 0's. What does 0×4 mean?

10. *a.* $2 \times 0 = ?$ *b.* $0 \times 2 = ?$ *c.* $0 \times 8 = ?$ *d.* $0 \times 0 = ?$

▶ The product of any number and 0 is 0.

11. Copy and complete this table of 9's. Notice how the right-hand figures of the products decrease. Notice how the left-hand figures of the products increase.

$0 \times 9 = 0$ $5 \times 9 = ?5$
$1 \times 9 = 9$ $6 \times 9 = ??$
$2 \times 9 = 18$ $7 \times 9 = ??$
$3 \times 9 = 27$ $8 \times 9 = ??$
$4 \times 9 = 3?$ $9 \times 9 = ??$

12. What is the sum of the two figures in each product above?

13. Write the products for the following examples:

a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*
5	7	7	8	8	6	9	8	9	9
9	6	7	6	7	9	7	8	8	9

14. Now copy the examples above in their reverse order and write the products, as shown at the right.

$$\begin{array}{r} 7 \\ \times 3 \\ \hline 21 \end{array} \qquad \begin{array}{r} 3 \\ \times 7 \\ \hline 21 \end{array}$$

The Language of Multiplication

Read these different ways of writing multiplication examples and write the answers. Then write an example like each one of these but with different numbers.

1. How much are six 5's?
2. Multiply 3 by 4.
3. $6 \times 2 = ?$
4. Four times five equals what?
5. What is the product of 6 and 3?
6. Is the product of 7×4 the same as the sum of seven 4's?
7. What number is 6 times as much as 3?
8. Copy and work the example at the right.

$$\begin{array}{r} 32 \\ \times\ 3 \\ \hline \end{array}$$

9. 6×8 is how much more than 5×8?
10. Write this example as a multiplication example:

$$4 + 4 + 4 + 4 + 4 + 4 = 24$$

How Well Can You Multiply?

Copy these examples and multiply:

	a	*b*	*c*	*d*	*e*	*f*
1.	4×5	8×3	4×9	7×6	8×7	8×9
2.	12	20	62	123	401	512
	$\times\ 4$	$\times\ 3$	$\times\ 4$	$\times\ 3$	$\times\ 4$	$\times\ 4$
3.	24	72	251	316	200	209
	$\times\ 3$	$\times\ 6$	$\times\ 7$	$\times\ 5$	$\times\ 3$	$\times\ 6$
4.	403	450	12	50	42	24
	$\times\ 5$	$\times\ 7$	$\times\ 23$	$\times\ 36$	$\times\ 24$	$\times\ 31$
5.	28	50	620	210	412	324
	$\times\ 30$	$\times\ 40$	$\times\ 34$	$\times\ 21$	$\times\ 89$	$\times\ 203$

One-Place Multipliers

(Without carrying)

Peter noticed that four cork squares reached from wall to wall in the hallway of an office building. He tried to count the total number of squares in the hallway. He found that counting by 4's was slow work.

Then he remembered that multiplication is a short way of finding the total of two or more equal numbers. So he counted to find the number of rows. There were 32 rows. Then he multiplied 32 by 4.

$$\begin{array}{r} 32 \\ \times\ 4 \\ \hline 128 \end{array}$$

Here is Peter's work. Explain each step of the multiplication.

Copy these examples and multiply:

	a	*b*	*c*	*d*	*e*	*f*	*g*
1.	12	11	21	131	223	211	522
	2	4	3	2	3	6	4

2. Mary bought three cans of soup at 23 cents a can. How much did the three cans cost?

3. Explain the multiplication for each of the examples at the right.

A	B	C
20	403	200
× 3	× 2	× 4
60	806	800

Write the products only:

	a	*b*	*c*	*d*	*e*	*f*
4.	3 × 10	2 × 20	3 × 30	2 × 50	3 × 50	4 × 50
5.	2 × 60	3 × 70	4 × 100	3 × 200	5 × 200	3 × 600

Copy these examples and multiply:

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*
6.	20	70	90	80	60	200	100	500
	4	6	7	9	5	3	8	4
7.	900	400	700	400	102	602	801	5002
	6	9	8	5	4	3	5	4

Two- and Three-Place Multiplicands with Carrying

A large bag of flour weighs 98 pounds. How much will 3 of these bags weigh?

Three times 8 ones equals 24 ones, or 2 tens and 4 ones. Write the 4 in ones' place. Three times 9 tens equals 27 tens. Twenty-seven tens plus 2 tens equals 29 tens or 2 hundreds and nine tens. Write the 9 in tens' place and the 2 in hundreds' place.

A
98
× 3
294

Three bags of flour will weigh 294 pounds.

In Example **B** what figure is carried to hundreds' place? In Example **C** what figure is carried to tens' place? To hundreds' place?

B	C
271	475
× 4	× 7
1084	3325

1. Copy Examples **A, B,** and **C** without the answers. Then close your book and work the examples. Check your answers.

Working the examples in Rows **2** to **5** will help you to add carried numbers when you multiply. Give the answers orally.

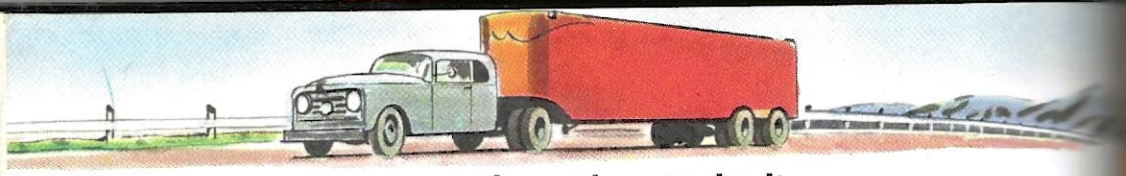
	a	*b*	*c*	*d*
2.	Five 3's + 2	Four 0's + 3	Four 6's + 3	Three 8's + 2
3.	Six 7's + 4	Seven 8's + 4	Seven 8's + 5	Eight 6's + 7
4.	Six 8's + 5	Eight 8's + 5	Eight 0's + 7	Eight 7's + 7
5.	Seven 9's + 5	Nine 9's + 8	Eight 9's + 7	Nine 7's + 8

Copy these examples and multiply. Check your work.

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*
6.	26	17	38	29	37	48	76	54	69
	× 3	× 5	× 4	× 3	× 6	× 5	× 6	× 7	× 7
7.	48	33	39	56	63	78	89	129	216
	× 8	× 9	× 6	× 7	× 8	× 8	× 9	× 3	× 4
8.	907	508	536	987	789	654	5897	4065	2879
	× 6	× 4	× 4	× 6	× 7	× 8	× 8	× 9	× 9

9. Fred ran around the 452-foot running track 3 times. How far did he run?

10. Helen lived 17 blocks from school. If she rode her bicycle to school and back twice a day, how many blocks did she ride?



Two- and Three-Place Multipliers

The Midwestern Trucking Company owns a fleet of 26 large trucks. There are 14 wheels on each truck. How many new tires must the company buy if it puts new tires on all the wheels of the fleet at one time?

First multiply 14 by the 6 ones and write the product, 84. Be sure to place the 4 in the ones' column and the 8 in the tens' column. Then multiply 14 by the 2 tens and write the product, 28, so that the 8 is in the tens' column and the 2 is in the hundreds' column.

	Check
14	26
26	14
84	104
28	26
364	364

▶ The numbers 84 and 28 are called **partial products.**

Add the partial products. The company must buy 364 new tires. Study the check next to the example above. The order of the numbers, 14 and 26, has been changed in the check. Is the product of 26×14 the same as the product of 14×26?

Study these examples. Notice the position of each figure in the partial products.

A		B		C	
	36		230		423
	25		82		212
	180		460		846
	72		1840		423
					846

1. Copy Examples **A**, **B**, and **C** without the partial products. Close your book and do the multiplication. Then open your book and check your partial products with those in the book. To complete the examples, find the sum of the partial products.

Copy these examples and multiply. Be sure to place each figure in its proper column. Check each example as shown above.

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*
2.	14	41	221	511	85	97	58	275	498
	21	34	12	45	46	36	48	51	89
3.	323	341	212	248	412	365	418	4876	1976
	32	12	124	232	443	165	435	765	489

Zero in the Multiplier

Tom has 95 hens. They lay about 60 eggs a day. About how many eggs will they lay in a 30-day month?

Think: If the hens lay 60 eggs each day, they will lay 30 times as many in 30 days. $30 \times 60 = ?$

There are no ones by which to multiply. Write 0 in ones' place. Next multiply by the 3 in tens' place. 3 tens times 0 is 0 tens. Write 0 in tens' place. 3 tens times 6 tens are 18 hundreds. Write 18 at the left of the zeros in your product.

Tom's hens will lay about 1800 eggs in a 30-day month.

A	
	60
	30
	1800

B	
	216
	300
	64,800

Study Example **B**. Why is the 8 in the product placed directly under the 3? Why is a zero placed in ones' place and in tens' place in the product?

Now study Example **C**. First multiply by the 6. Then multiply by the 2. The 8 in the second partial product is placed in the hundreds' column because the 2 in the multiplier means 2 hundreds.

C	
	324
	206
	1 944
	64 8
	66,744

Copy these examples and multiply. Check your work.

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*
1.	12	25	42	65	70	50	80	10	75
	20	10	30	40	50	20	50	10	80
2.	214	432	102	209	506	400	600	100	470
	30	10	40	60	80	90	50	10	70
3.	432	756	216	521	425	400	800	708	100
	200	300	107	100	803	200	500	409	100

Multiplying Money Numbers

One summer Tom raised 5 bushels of potatoes in his garden. He sold them for $2.25 a bushel. How much did he receive all together?

Since 5 bushels are worth 5 times as much as 1 bushel, you multiply $2.25 by 5 to find how much Tom received for 5 bushels.

Multiply $2.25 by the 5 in the same way that you would multiply if the number were 225 instead of $2.25.

$$\begin{array}{r} \$2.25 \\ \times \quad 5 \\ \hline \$1125 \end{array}$$

Do you think that Tom would have received $1125 or $11.25 for the 5 bushels of potatoes?

Copy the example and complete the work by writing the decimal point between the number for dollars and the number for cents in the product. Then place a dollar sign to the left of number of dollars.

Tom received $11.25 for his potatoes.

Study Examples **A** and **B**. Read the numbers in each example. Do the products seem reasonable?

A	**B**
$\$ .95$	$\$.07$
$\times \quad 9$	$\times \quad 8$
$\$ 8.55$	$\$.56$

Now study Examples **C** and **D**. In Example **C**, zeros are used to show that there are no cents. In Example **D**, only the dollars are shown.

C	**D**
$\$12.00$	$\$15$
$\times \quad 4$	$\times \quad 3$
$\$48.00$	$\$45$

▶ Any number of **whole dollars** may be written either with or without a decimal point and two zeros to the right of the decimal point.

Write these amounts in figures. Write a dollar sign before each number. Place a decimal point wherever needed.

	a	*b*
1.	forty cents	nine cents
2.	four dollars and ninety cents	one dollar
3.	one hundred dollars and one cent	one hundred dollars

Write these amounts in words:

	a	*b*	*c*	*d*	*e*
4.	$10.50	$2.06	$.25	$.80	$.10
5.	$.07	$1.00	$10.00	$100.00	$101.00
6.	$500	$220.40	$105	$1000.00	$1010.10

Copy each example with its correct answer:

	a	*b*
7.	$2 \times \$1.25 = \$250, \$2.50,$ or $\$25.00$	$10 \times \$.10 = \$1.00, \$10,$ or $\$100$
8.	$5 \times \$.06 = \$30, \$.30,$ or $\$3.00$	$10 \times \$10 = \$1.00, \$1000,$ or $\$100$
9.	$8 \times \$1.00 = \$80, \$8.00,$ or $\$.80$	$5 \times \$2.18 = \$10.90, \$1.09,$ or $\$1090$

Copy and multiply:

	a	*b*	*c*	*d*	*e*	*f*	*g*
10.	$1.36	$2.01	$.89	$.18	$.09	$40	$1.27
	7	3	8	4	6	20	10
11.	$.46	$3.50	$2.25	$96	$.08	$2.75	$100
	35	25	48	36	16	100	100

12. *a.* $4 \times \$1.25$ *b.* $9 \times \$.68$ *c.* $12 \times \$1.98$ *d.* $10 \times \$.40$

13. Jack worked for $.90 an hour for 8 hours. How much did he earn all together?

14. Clare sold 24 boxes of strawberries for $.20 each. How much did she receive for the 24 boxes?

*15. For George's sports club party, his mother bought 3 dozen sugared doughnuts at 35¢ a dozen, 2 pounds of popcorn at $.40 a pound, and 5 pounds of candy at 49¢ a pound. How much did she pay in all?

Multiplying by Ten and by One Hundred

Joan bought ten 6¢ stamps for her father. How much did she pay for the stamps?

Joan did the multiplication as shown at the right. Her father told her that she could multiply by 10 by placing a zero to the right of the whole number being multiplied.

$$\begin{array}{r} 6¢ \\ \times\ 10 \\ \hline 60¢ \end{array}$$

1. Write the figure 6 on your paper. Then place a zero to the right of the 6, like this: 60. Now write the example like this: $10 \times 6 = 60$.

2. How much is 10×2? 10×4? 10×5?

3. What number do you have if you place a zero to the right of the figure 8? $10 \times 8 = ?$

4. Multiply 7 by 10 by placing a zero to the right of the 7. $10 \times 7 = ?$

5. What number do you have if you place a zero to the right of the number 30? $10 \times 30 = ?$

6. *a*. $10 \times 50 = ?$ *b*. $10 \times 75 = ?$ *c*. $10 \times 36 = ?$

7. If we place two zeros to the right of 5, we have 500. $100 \times 5 = ?$

8. Multiply 7 by 100 by placing two zeros to the right of the 7.

9. *a*. $100 \times 9 = ?$ *b*. $100 \times 12 = ?$ *c*. $100 \times 10 = ?$

▶ Placing a zero to the right of a whole number multiplies that number by 10.

▶ Placing two zeros to the right of a whole number multiplies that number by 100.

Copy these examples and write the products:

	a	*b*	*c*	*d*	*e*
10.	10×2	100×3	4×10	4×100	10×80
11.	10×25	100×25	36×10	36×100	10×125
12.	10×10	100×10	20×10	20×100	100×100

Be Reasonable

In solving problems, you will often save time and trouble by asking yourself, "Is the answer reasonable?" To answer this question, it helps if you know how to estimate.

▶ When we **estimate,** we make a good guess.

Using round numbers will help you estimate quickly. Suppose you wanted to find the cost of 8 notebooks at $.19 each.

To estimate the answer, round $.19 to $.20, and think: If each notebook cost $.20, my answer would be $1.60. Since each cost less, the total cost will be a little less than $1.60.

These examples will give you practice in estimating:

1. Is 11 × 49 about 50; 500; or 5000?
2. Is 29 × 30 about 900; 90; or 9000?
3. Is 5 × 198 about 100; 10,000; or 1000?
4. Is 8 × 91 about 70; 700; or 7000?
5. Is 48 × 52 about 2500; 250; or 25,000?

Round off the numbers and write only the estimated answer for each of these problems:

6. What would 37 books cost at $1.04 each?
7. Find the cost of 6 basketballs at $9.76 each.
8. Mr. Wright received $289 for one kind of television set in his store. How much would he receive if he sold 3 of these sets?
9. Bill's father earns $310 a month. How much does he earn in a year?
10. At $7.75 a yard, what will 3 yards of dress goods cost?
11. In 18 months what rent would Mrs. Peterson receive for the apartment she rented for $97.50 a month?
12. An ocean liner traveled 540 miles in twenty-four hours. At that rate how far will it travel in a week?

Now solve each problem. Compare each estimated answer with the accurate one. Were the two answers nearly the same? Does estimating help you to know whether your answer is reasonable?

Review of Unit 1

Copy these examples and find the products:

	a	*b*	*c*	*d*	*e*	*f*
1.	6×7	7×9	9×6	7×8	8×9	9×9
2.	40 2	321 3	200 4	102 3	94 2	18 4
3.	89 9	500 8	761 9	765 7	813 4	402 5
4.	34 21	32 30	40 20	50 80	51 64	91 15
5.	72 41	67 45	213 12	203 23	200 32	600 90
6.	894 76	412 52	256 37	204 30	300 40	405 45
7.	1798 6	3829 3	3004 31	2030 30	5000 30	1000 10
8.	4001 112	302 103	5006 405	5000 100	367 824	7368 736
9.	\$.07 8	\$15 3	\$1.83 24	\$3.28 10	\$2.75 100	\$10.50 12

Tell which is the more nearly correct answer:

	a	*b*
10.	11×386 = about 4000 or 400	9×526 = about 500 or 5000
11.	19×42 = about 80 or 800	41×89 = about 3600 or 360

12. A jet plane flew 620 miles an hour on its test flight. At the same rate, about how many thousand miles would this plane go in 10 hours?

13. Mr. Fairchild earns \$525 per month. About how many thousand dollars does he earn in one year?

Another Way of Multiplying

(Enrichment)

The example, 21×12, can be figured on paper as shown at the right. But we can figure this example without bothering to write it.

$$\begin{array}{r} 12 \\ \times\ 21 \\ \hline 12 \\ 24 \\ \hline 252 \end{array}$$

We can think: Ten 12's equal 120. Twenty 12's equal twice as many as ten 12's, or 240. Then twenty-one 12's = 240 + 12, or 252. Or, you may think: $20 \times 10 = 210$, and $2 \times 21 = 42$. Then $210 + 42 = 252$.

Study the way these two examples are worked:

7×18	8×148
seven 10's = 70	eight 100's = 800
seven 8's = 56	eight 40's = 320
126	eight 8's = 64
	1184

Tell or write the multiplication facts you need to know to do the following examples without paper and pencil. Then write the answers.

1. 3×27	3. 6×126	5. 30×40	7. 12×75	9. 15×73
2. 9×33	4. 14×32	6. 12×48	8. 15×60	10. 16×74

Write the answers to these examples:

	b	*c*	*d*	*e*
11. 4×48	5×84	7×69	8×72	9×99
12. 3×248	4×350	6×408	7×309	8×236
13. 20×32	30×150	60×800	12×38	15×360

14. Make up five examples of your own like those in Exercises 11 to 13. Then write the answers without showing the work.

UNIT 2 DIVISION

The Meaning of Division

1. Mrs. Reed asked Frank to divide her class of 36 pupils into teams of nine to play passball. Frank chose 9 players. Then he took 9 more players away from the class to make another team. How many times in all would he have to take 9 players away to divide the class of 36 into teams of nine?

Jack said he knew a better way to divide the class. Jack divided 36 by 9. He said that there would be 4 teams.

a. Which boy used subtraction to divide the class into teams?

b. Did both boys have the same number of teams?

c. Which method was quicker?

```
36
-9
27
-9
18
-9
 9
-9
 0

 4
9)36
```

We divide when we wish to find how many groups of equal size there are in a larger group.

2. The school dentist asked Miss Brown to send him a fourth of her class at one time. Miss Brown had 32 pupils. How many pupils should she send to the dentist at one time?

Think: To find $\frac{1}{4}$ of 32, I will divide 32 into 4 equal groups.

$32 \div 4 = 8$, so one fourth of 32 is 8. How many pupils should Miss Brown send at one time?

We also divide when we wish to find the size of a number of equal groups in a larger group.

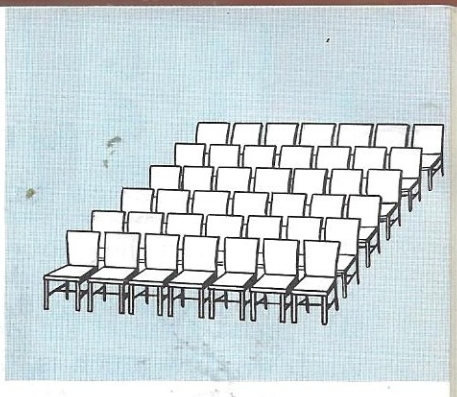
3. The division example $36 \div 9 = 4$ is read, "36 divided by 9 equals 4." What sign stands for divide?

4. Look at the division example at the right. What multiplication fact answers the question, "How many 3's are there in 15?"

```
   5    quotient
3)15    dividend
 ↖
divisor
```

- The number we divide is called the **dividend.**
- The number by which we divide is called the **divisor.**
- The answer to a division example is called the **quotient.**

Helps in Division



1. Dan and Pat helped place chairs for a movie to be shown in the gym. They made 6 rows with 7 chairs in each row. How many chairs were there in all?
2. $6 \times 7 = ?$ $7 \times 6 = ?$
3. How many 6's in 42? $42 \div 6 = ?$
4. How many 7's in 42? $42 \div 7 = ?$

$6 \times 7 = 42$
$7 \times 6 = 42$
$42 \div 6 = 7$
$42 \div 7 = 6$

A group of related multiplication and division facts like the group at the right is called a **family.** Most multiplication and division families contain four related facts. But some of the families, such as the one shown at the right, have only two related facts. Why?

$6 \times 6 = 36$
$36 \div 6 = 6$

5. Write the family of multiplication and division facts for 8 and 7.

Write the family of related multiplication and division facts for each of these facts.

	a	*b*	*c*	*d*
6.	$5 \times 6 = 30$	$28 \div 4 = 7$	$9 \times 4 = 36$	$7 \times 9 = 63$
7.	$40 \div 5 = 8$	$7 \times 7 = 49$	$6 \times 8 = 48$	$9 \times 5 = 45$
8.	$54 \div 6 = 9$	$8 \times 8 = 64$	$9 \times 9 = 81$	$72 \div 8 = 9$

Using Zero and One in Division

1. How many ones are there in 4? In 7? In 3?
2. *a.* $2 \div 1 = ?$ *b.* $5 \div 1 = ?$ *c.* $9 \div 1 = ?$ *d.* $8 \div 1 = ?$ *e.* $1 \div 1 = ?$

The quotient of any number divided by 1 is that number.

3. *a.* How many twos are there in 0? *b.* How many 5's are there in 0?
4. *a.* $0 \div 3 = ?$ *b.* $0 \div 6 = ?$ *c.* $0 \div 9 = ?$ *d.* $0 \div 10 = ?$ *e.* $0 \div 1 = ?$

The quotient of 0 divided by any number is 0.

The Language of Division

1. There are how many 5's in 40?

2. What is the quotient of ten divided by two?

3. *a.* Divide 36 by 9 *b.* $24 \div 6 = ?$ *c.* $24 \div ? = 6$

4. *a.* How much is 32 divided by 8? *b.* What number is $\frac{1}{4}$ as large as 48?

5. Copy and work this example: $4\overline{)20}$

6. Which number is the divisor in this example: Fifty-four divided by nine equals six?

7. *a.* $9 \times 8 = 72$ *b.* $72 \div 9 = ?$ *c.* $72 \div 8 = ?$

8. What number divided by 3 gives a quotient of 10?

9. What is the remainder when 17 is divided by 5?

10. Divide 15 cents by 5.

11. $6300 \div 75 = 84$ $6300 \div 84 = ?$

How Well Can You Divide?

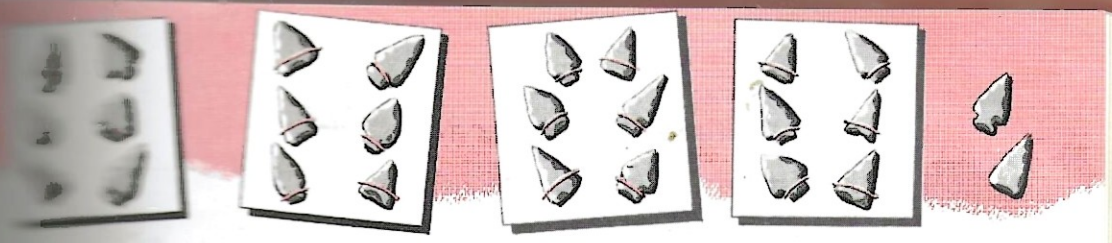
Write or tell the answers to these examples:

	a	*b*	*c*	*d*	*e*
1.	$15 \div 5 = ?$	$18 \div 2 = ?$	$21 \div 3 = ?$	$54 \div 6 = ?$	$32 \div 8 = ?$
2.	$36 \div 4 = ?$	$40 \div 8 = ?$	$42 \div 7 = ?$	$56 \div 8 = ?$	$63 \div 9 = ?$
3.	$\frac{1}{2}$ of $24 = ?$	$\frac{1}{3}$ of $36 = ?$	$\frac{1}{4}$ of $60 = ?$	$\frac{1}{5}$ of $100 = ?$	$\frac{1}{8}$ of $360 = ?$

4. $19 \div 4 = ?$ and ? remaining. 6. $29 \div 6 = ?$ and ? remaining.

5. $45 \div 7 = ?$ and ? remaining. 7. $60 \div 8 = ?$ and ? remaining.

	a	*b*	*c*	*d*	*e*
8.	$7\overline{)35}$	$8\overline{)43}$	$4\overline{)48}$	$2\overline{)60}$	$4\overline{)260}$
9.	$4\overline{)92}$	$4\overline{)77}$	$6\overline{)342}$	$7\overline{)375}$	$5\overline{)305}$
10.	$6\overline{)425}$	$3\overline{)622}$	$5\overline{)1000}$	$10\overline{)80}$	$20\overline{)150}$
11.	$12\overline{)110}$	$15\overline{)700}$	$16\overline{)115}$	$25\overline{)1875}$	$28\overline{)2496}$



The Remainder in Division

John finds many Indian arrowheads on his father's farm. He wanted to exhibit 26 of his best ones at the school fair. How many cards will John need if he puts 6 arrowheads on each card?

John divided 26 arrowheads by 6 arrowheads in order to find how many groups of 6 arrowheads there are in 26 arrowheads.

$$\begin{array}{r} 4 \\ 6\text{ arrowheads})\overline{26\text{ arrowheads}} \\ \underline{24\text{ arrowheads}} \\ 2\text{ arrowheads} \end{array}$$

1. *a.* How many groups of 6 arrowheads are there in 26 arrowheads? Notice that the quotient, 4, is not called arrowheads.
   b. How many cards will John need?
   c. How many arrowheads will John have left?

2. *a.* In the example at the right, how many 6's are there in 52? *b.* How much is 8×6?
   c. What is the remainder? *d.* What is the quotient? We read the example: $52 \div 6 = 8$, with a remainder of 4.

$$\begin{array}{r} 8 \\ 6\overline{)52} \\ \underline{48} \\ 4 \end{array}$$

▶ When the answer to a division example does not come out even, the number left over is called a **remainder.**

▶ Division with a remainder is called **uneven division.**

Now work these examples:

	a	*b*
3.	$19 \div 4 =$? with a remainder of ?	$27 \div 5 =$? with a remainder of ?
4.	$38 \div 6 =$? with a remainder of ?	$80 \div 9 =$? with a remainder of ?

Work these examples in the same way:

	a	*b*	*c*	*d*	*e*
5.	$35 \div 4$	$26 \div 4$	$28 \div 4$	$34 \div 5$	$35 \div 5$
6.	$38 \div 6$	$39 \div 6$	$30 \div 7$	$38 \div 7$	$31 \div 8$

Multiplication Helps You Divide

Look at Example **A.** If you remember that $8 \times 4 = 32$, you will know that the quotient is 8.

Now look at Example **B.** Think: Eight 4's are 32. 32 from 35 leaves 3.

The quotient is 8 and the remainder is 3.

A $4\overline{)32}$?

B
$$\begin{array}{r} 8 \\ 4\overline{)35} \\ 32 \\ \hline 3 \end{array}$$

1. Here are all the whole numbers that contain 4 eight times but not nine times: 32 33 34 35. Divide each number by 4, and show the remainder, if any.

2. Now write all the numbers that contain 4 seven times but not eight times.

3. Divide each number that you just wrote by 4.

What multiplication fact helps you find the quotient in each of these pairs of examples?

	a		*b*		*c*		*d*	
4.	$3\overline{)18}$	$3\overline{)20}$	$4\overline{)16}$	$4\overline{)19}$	$5\overline{)40}$	$5\overline{)43}$	$3\overline{)27}$	$3\overline{)29}$
5.	$6\overline{)42}$	$6\overline{)47}$	$7\overline{)49}$	$7\overline{)54}$	$6\overline{)54}$	$6\overline{)58}$	$7\overline{)56}$	$7\overline{)60}$
6.	$8\overline{)64}$	$8\overline{)70}$	$9\overline{)63}$	$9\overline{)70}$	$8\overline{)72}$	$8\overline{)76}$	$9\overline{)81}$	$9\overline{)89}$

7. The products of 5 multiplied by each number from 1 to 9 are given below. You think: $1 \times 5 = 5$, $2 \times 5 = 10$, and so on. Do the others in the same way.

5 10 15 20 25 30 35 40 45

8. Write the product of 6 multiplied by each number from 1 to 9.

9. Now write the products of 7 multiplied by each number from 1 to 9.

10. Do the same with 8 and 9.

11. What numbers contain 6 seven times but not eight times?

12. What numbers contain 8 eight times but not nine times?

13. What numbers contain 9 eight times but not nine times?

Two-Figure Quotients

Dividing larger numbers will be easy if you understand how to divide small numbers.

Notice that the first part of Example **B** is like Example **A**.

A	4	**B**	4
	6)27		6)271
	24		24
	3		3

1. Copy Example **B** and complete the work. Bring down the 1 and write it next to the 3 tens to make 31. Then divide the 31 just like the 27 was divided. Your answer should be 45, with a remainder of 1.

Work these pairs of examples. Working example *a* helps you to do example *b* in each pair.

2. *a.* $5\overline{)32}$ *b.* $5\overline{)324}$
3. *a.* $6\overline{)41}$ *b.* $6\overline{)410}$
4. *a.* $4\overline{)35}$ *b.* $4\overline{)358}$
5. *a.* $7\overline{)58}$ *b.* $7\overline{)587}$

6. Study Example **C**. Be sure that you can explain each step. Notice that there is no remainder when we subtract 12 from 12.

C	32
	4)129
	12
	9
	8
	1

Tell how to finish each of these examples:

7.

a	*b*	*c*	*d*
7	8	8	6
6)458	7)600	4)326	8)500
42	56	32	
38			

Study Example **D**. It shows you how to check a division example. Notice that we find the product of the quotient and the divisor. When there is a remainder, we add it to the product.

8. Check the examples that you completed in Exercise 7.

D	46	Check: 46
	7)324	× 7
	28	322
	44	+ 2
	42	324
	2	

Copy these examples and divide:

9.

a	*b*	*c*	*d*	*e*	*f*
$4\overline{)96}$	$3\overline{)64}$	$4\overline{)300}$	$5\overline{)430}$	$4\overline{)350}$	$6\overline{)358}$
$4\overline{)364}$	$5\overline{)480}$	$6\overline{)475}$	$6\overline{)585}$	$7\overline{)392}$	$8\overline{)495}$
$8\overline{)584}$	$8\overline{)677}$	$9\overline{)650}$	$8\overline{)784}$	$9\overline{)793}$	$9\overline{)885}$

The Steps in Division

Copy the example at the right. Now work the example by doing the steps that are given below. Check each step of your work with the work at the right.

$6\overline{)291}$

Step 1. Divide. There are four 6's in 29. Since you are dividing 29 tens, write the 4 in tens' place above the 9.

Step 2. Multiply. 6×4 tens $= 24$ tens. Write the 24 under the 29.

Step 3. Subtract. 29 tens $-$ 24 tens $= 5$ tens. Write the remainder, 5 tens.

Step 4. Bring down. Bring down the next figure in the dividend and write it next to the 5 tens to make 51.

Now divide 51 by 6. $51 \div 6 = 8$. Write the 8 in the quotient in ones' place.

Multiply 6 by 8 and write 48 under 51.

Subtract 48 from 51. The remainder is 3.

Check your work by finding the product of the quotient and the divisor, and adding the remainder to the product. The result should equal the dividend, 291.

Step 1
$$6\overline{)291}\quad 4$$

Step 2
$$\begin{array}{r} 4 \\ 6\overline{)291} \\ 24 \end{array}$$

Step 3
$$\begin{array}{r} 4 \\ 6\overline{)291} \\ 24 \\ \hline 5 \end{array}$$

Step 4
$$\begin{array}{r} 4 \\ 6\overline{)291} \\ 24 \\ \hline 51 \end{array}$$

Can You Tell the Next Step?

Each of the following examples is partly worked. Tell what the next step is in each example. Then complete the examples. Check your work.

1. $4\overline{)35}$ — $\underline{32}$

2. $3\overline{)84}$ — $\underline{6}$ — 2

3. $5\overline{)480}$

4. $6\overline{)5094}$ — $\underline{48}$ — 29

5. $7\overline{)5680}$ — $\underline{56}$ — 8

More Help from Multiplication

1. Write the multiplication table of 9's from $1 \times 9 = 9$ to $9 \times 9 = 81$.

2. Write the multiplication table of 8's from $1 \times 8 = 8$ to $9 \times 8 = 72$.

Use the tables that you have written to help you work the following examples. Tell or write the multiplication fact or facts that you use to do each example.

	a	*b*	*c*	*d*	*e*	*f*
3.	$8\overline{)64}$	$8\overline{)52}$	$9\overline{)63}$	$9\overline{)50}$	$8\overline{)75}$	$9\overline{)78}$
4.	$9\overline{)630}$	$9\overline{)281}$	$8\overline{)185}$	$8\overline{)448}$	$9\overline{)240}$	$9\overline{)407}$
5.	$9\overline{)492}$	$8\overline{)715}$	$9\overline{)670}$	$9\overline{)784}$	$8\overline{)794}$	$9\overline{)890}$

Dividing Larger Numbers

Study the example at the right and answer these questions about it.

1. There are seven 6's in 46. Why is the 7 placed in the hundreds' place in the quotient?

2. How many 6's are there in 49?

3. What is the place value of the 8 in the quotient?

4. What was the next step of the work after we subtracted 48 from 49?

5. Why is the 3 placed in ones' place in the quotient?

hundreds	tens	ones
	7	83
6	46	98
	42	
	49	
	48	
		18
		18

Copy these examples and divide:

	a	*b*	*c*	*d*	*e*
6.	$3\overline{)2306}$	$4\overline{)6704}$	$5\overline{)4258}$	$3\overline{)2788}$	$4\overline{)3687}$
7.	$5\overline{)2965}$	$6\overline{)2330}$	$7\overline{)6819}$	$7\overline{)6040}$	$8\overline{)2998}$
8.	$9\overline{)3064}$	$8\overline{)6980}$	$9\overline{)8783}$	$6\overline{)59000}$	$7\overline{)68785}$

Estimating Your Answer

Jim Brown went on a fishing trip with his father. They drove 936 miles in 3 days. If they drove about the same distance each day, about how far did they drive in 1 day?

a. In round numbers, how far did they go in the 3 days?

b. In 1 day they would go about one third as far as they would go in 3 days. What is one third of 900 miles?

c. What is the estimated answer for this problem?

In order to estimate the answer to a division example we need to know how many places there will be in the quotient.

In this example, the first quotient figure will be in tens' place because we divide 32 tens by 5. $5\overline{)321}$

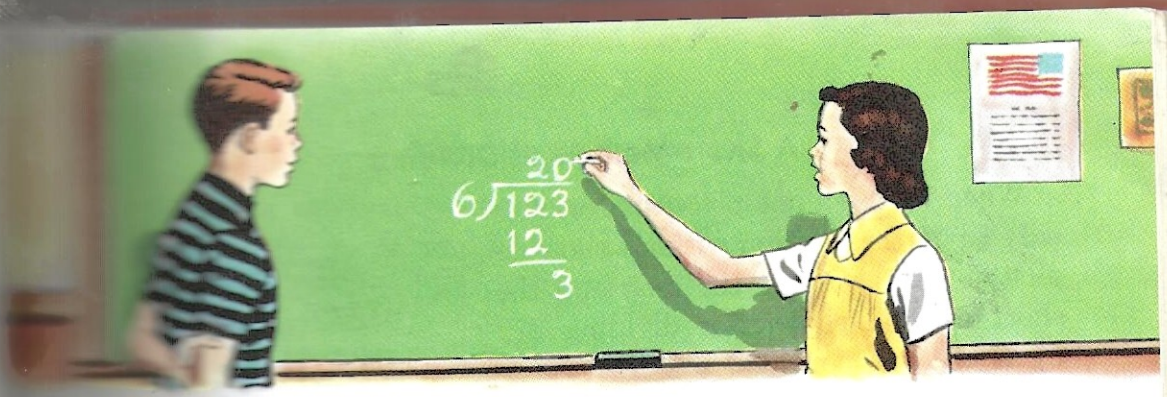
1. How many places will there be in the quotient?
2. Estimate the quotient.
3. Now copy, work, and check the example. Was your estimate close to the real quotient?

Tell the first quotient figure, and how many places there will be in the quotient of each of the following examples.

	a	*b*	*c*	*d*	*e*
4.	210 ÷ 4	94 ÷ 3	374 ÷ 6	3701 ÷ 4	4316 ÷ 5
5.	825 ÷ 2	2900 ÷ 3	5840 ÷ 7	7390 ÷ 8	4490 ÷ 9

6. Estimate and then work each example in Exercises 4 and 5.

7. Mr. Barnes picked 128 melons to take to the market. He packed them in crates which held 6 melons each. How many crates of melons did he have? First estimate the answer to this problem. Then work the problem. Would any melons be left over?



Zeros in the Quotient

Jack was puzzled when he was working this example on the blackboard. He asked Jane to help him. Jane said, "The next step is **divide**. You divide 3 by 6." But Jack said, "I can't divide 3 by 6 because there are no 6's in 3."

$$\begin{array}{r} 2 \\ 6\overline{)123} \\ 12 \\ \hline 3 \end{array}$$

"That is right," replied Jane. "There are no 6's in the 3 ones, and so you write a zero in ones' place in the quotient. Six is contained in 3 zero times, with a remainder of 3. Your answer is 20, with 3 remaining."

$$\begin{array}{r} 20 \\ 6\overline{)123} \\ 12 \\ \hline 3 \end{array}$$

Study Examples **A** and **B** and explain each step of the work.

A	**B**
$\begin{array}{r} 604 \\ 4\overline{)2416} \\ 24 \\ \hline 16 \\ 16 \\ \hline \end{array}$	$\begin{array}{r} 300 \\ 6\overline{)1805} \\ 18 \\ \hline 05 \end{array}$

1. For each of the examples below tell the first quotient figure and the number of places in the quotient. Then copy the examples and do the division. Check your work.

a	*b*	*c*	*d*	*e*	*f*
2. $3\overline{)92}$	$2\overline{)160}$	$4\overline{)920}$	$5\overline{)4025}$	$6\overline{)602}$	$8\overline{)5610}$
3. $6\overline{)425}$	$7\overline{)282}$	$9\overline{)720}$	$8\overline{)6440}$	$9\overline{)8163}$	$8\overline{)7360}$
4. $2\overline{)800}$	$3\overline{)1500}$	$5\overline{)3000}$	$7\overline{)3501}$	$9\overline{)8370}$	$6\overline{)9005}$

5. Mr. Wheeler drove his automobile 120 miles in 3 hours. About what was his speed per hour?

A Short Method of Dividing

When we use a one-place divisor, it is easy to do the division without showing all the work. Study the long and the short method shown for dividing 272 by 4.

A	B
68	68
4)272	4)272
24	
32	
32	

In Example **A**, each step of the work is shown. Now look at Example **B**.

To work Example **B**, think: There are six 4's in 27 with a remainder of 3. Then write the 6 in the quotient. Think: The remainder is 3 tens. The 3 tens and the 2 in ones' place are 32. There are eight 4's in 32. Write the 8 in the quotient.

Copy and work this example by the short method. $5\overline{)369}$

Think: There are seven 5's with a remainder of 1 in 36. Write the 7 in tens' place in the quotient. Think: The remainder is 1 ten. The 1 ten and the 9 in ones' place are 19. $19 \div 5 = 3$ with a remainder of 4. Write the 3 in the quotient. Write the remainder, 4, to the right of the quotient as shown. Your answer should read, "73 and 4 remaining."

$5\overline{)369}$ 73 and 4 remaining

Notice that each division in the examples below comes out even. Study these examples and explain each step of the work.

	12	41	40	703	200	4000
1.	*a.* $3\overline{)36}$	*b.* $4\overline{)164}$	*c.* $3\overline{)120}$	*d.* $2\overline{)1406}$	*e.* $4\overline{)800}$	*f.* $6\overline{)24000}$

Work each example in Exercise **2** using the long method first, and then the short method.

	a	*b*	*c*	*d*	*e*	*f*
2.	$4\overline{)293}$	$5\overline{)450}$	$6\overline{)476}$	$8\overline{)7256}$	$7\overline{)6230}$	$9\overline{)70206}$

Copy these examples and work them by using the short method.

	a	*b*	*c*	*d*	*e*	*f*
3.	$3\overline{)48}$	$4\overline{)840}$	$4\overline{)100}$	$5\overline{)350}$	$6\overline{)282}$	$8\overline{)200}$
4.	$7\overline{)212}$	$6\overline{)459}$	$7\overline{)500}$	$8\overline{)6511}$	$9\overline{)4772}$	$9\overline{)7860}$

More Helps in Division

When we work this example, we think eight 8's are 64, and 64 from 71 is 7. So we say that the quotient is 8 and the remainder is 7.

$$8\overline{)71}$$ A 8 and 7 remaining

The following subtraction practice will help you use the short method of division. Write the answers only.

	a	*b*	*c*	*d*	*e*	*f*	*g*
1.	13−8	12−7	14−9	15−8	14−8	16−9	17−9
2.	59−54	48−42	88−81	59−56	80−72	23−16	25−18
3.	30−24	35−27	33−28	31−24	40−36	41−35	52−45
4.	42−36	54−49	61−56	71−64	62−54	80−72	72−63

5. Write all the numbers from the group below that contain:

a. 6 an even number of times. *c*. 8 an even number of times.

b. 7 an even number of times. *d*. 9 an even number of times.

6.	12	16	18	21	29	36	28	27	24	64	66
7.	81	49	42	35	40	45	54	32	48	72	75

Practice in the Short Method of Division

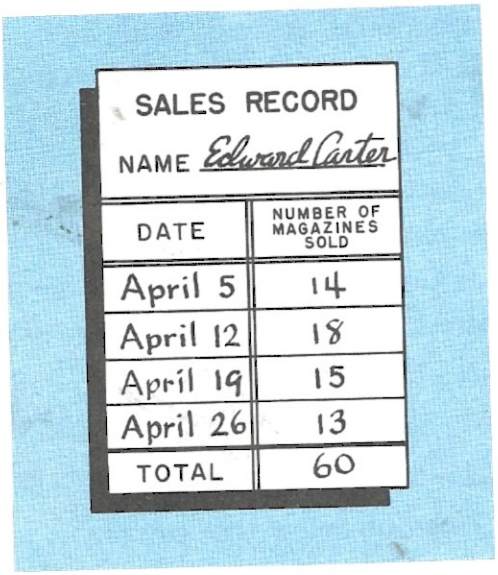
Give the quotients and remainders orally for these examples:

	a	*b*	*c*	*d*	*e*	*f*
1.	$2\overline{)64}$	$3\overline{)48}$	$5\overline{)49}$	$7\overline{)40}$	$6\overline{)51}$	$8\overline{)46}$
2.	$6\overline{)53}$	$7\overline{)48}$	$9\overline{)61}$	$8\overline{)55}$	$7\overline{)65}$	$9\overline{)80}$
3.	$3\overline{)86}$	$4\overline{)169}$	$5\overline{)456}$	$6\overline{)550}$	$4\overline{)100}$	$7\overline{)212}$

Copy and divide. Use the short method of division.

	a	*b*	*c*	*d*	*e*	*f*
4.	$5\overline{)92}$	$3\overline{)175}$	$4\overline{)317}$	$6\overline{)459}$	$5\overline{)470}$	$7\overline{)500}$
5.	$\frac{1}{2}$ of 96	$\frac{1}{2}$ of 650	$\frac{1}{5}$ of 100	$\frac{1}{8}$ of 200	$\frac{1}{6}$ of 96	$\frac{1}{3}$ of 75
6.	$6\overline{)588}$	$6\overline{)548}$	$9\overline{)685}$	$8\overline{)599}$	$7\overline{)604}$	$8\overline{)721}$
7.	$4\overline{)809}$	$4\overline{)9600}$	$5\overline{)4023}$	$8\overline{)6872}$	$7\overline{)6369}$	$9\overline{)88250}$

Finding Averages



SALES RECORD

NAME *Edward Carter*

DATE	NUMBER OF MAGAZINES SOLD
April 5	14
April 12	18
April 19	15
April 26	13
TOTAL	60

Edward sells a weekly magazine. At the left you see how one page in his account book looked. How many magazines did Edward sell in four weeks? What was the average number he sold in a week?

First find the total number of magazines Edward sold in the four weeks. Then, to find the average, divide the total number of magazines by the number of weeks.

$$4\overline{)60}$$

Edward sold an average of 15 magazines a week. In one week he sold more than 15 magazines and in two weeks he sold fewer than 15. If Edward had sold exactly 15 magazines each week, the total number sold during the four weeks would have been the same as the number he did sell.

1. Mr. Perry, a fruit grower, sold 135 pounds of apples on Monday, 75 pounds on Tuesday, and 92 pounds on Friday. What was the average number of pounds sold in a day?

2. Mr. Perry kept a record of his sales for 6 days. He sold 2280 pounds of apples during that time. What was the average number of pounds sold per day?

3. Mrs. Nelson kept the following record of the eggs which she gathered during one week:

Sun.	Mon.	Tue.	Wed.	Thurs.	Fri.	Sat.
6	5	5	8	9	6	10

Find the average number of eggs she gathered per day.

4. One day a group of Boy Scouts hiked over the Lookout Trail for a distance of 12 miles. They were on the trail 4 hours. Find the average distance they walked in an hour.

Dividing by Even Tens

Hazel had 40 sheets of paper to pass out to the class. There were 20 pupils in the class. How many sheets of paper did Hazel give each pupil if she divided the sheets of paper equally?

How many 20's are there in 40? There are as many 20's in 40 as there are 2's in 4.

Each pupil received 2 sheets of paper.

A	
	2
	$20\overline{)40}$
	40

Study Example B.

Since there are no 30's in 17, we must use 174 for the first division. There are about as many 30's in 174 as there are 3's in 17. There are five 3's in 17. The 5 is written in tens' place above the 4. Next we multiply 30 by 5, and write the product under 174. $174 - 150 = ?$ Then we bring down the 5. How many 30's in 245? $8 \times 30 = ?$ The complete answer is 58 and 5 remaining.

B	
	58
	$30\overline{)1745}$
	150
	245
	240
	5

1. Count by 30's to 300. How many 30's in 46? 94? 180? 250?
2. Count by 40's to 400. How many 40's in 84? 125? 290? 340?
3. Count by 50's to 500. How many 50's in 75? 275? 310? 450?
4. Count by 60's to 600. How many 60's in 135? 300? 490?
5. Count by 70's to 700. How many 70's in 295? 400? 575?
6. Count by 80's to 800. How many 80's in 240? 542? 700?
7. Count by 90's to 900. How many 90's in 185? 584? 850?

Copy these examples and divide. Check your work.

a	*b*	*c*	*d*	*e*	*f*
8. $80 \div 20$	$120 \div 30$	$160 \div 20$	$150 \div 30$	$100 \div 20$	$200 \div 50$
9. $40\overline{)968}$	$50\overline{)352}$	$50\overline{)169}$	$50\overline{)482}$	$40\overline{)825}$	$40\overline{)973}$
10. $60\overline{)725}$	$60\overline{)770}$	$80\overline{)560}$	$90\overline{)686}$	$50\overline{)2540}$	$30\overline{)5350}$
11. $40\overline{)9500}$	$50\overline{)2500}$	$20\overline{)1750}$	$70\overline{)3918}$	$80\overline{)5942}$	$90\overline{)7883}$

Rounding Off Two-Place Divisors

Bill is dividing 64 by 18. He knows that 18 is almost 20. He rounds off the divisor 18 to 20, which is the nearest even ten. There are about as many 20's in 64 as there are 2's in 6. Copy and complete Bill's example.

$$18\overline{)64}$$

▶ Rounding off two-place divisors to the **nearest ten** helps us find the quotient.

Answer the following questions. They will help you use divisors that are near an even ten.

1. How many 20's are there in 80? How many 19's? 17's?
2. How many 22's are there in 80? How many 24's? 23's?
3. How many 30's are there in 120? How many 29's? 27's?
4. What divisor do you use to help you estimate the number of 28's in 120?
5. What divisor do you use to help you estimate how many 45's there are in 160?

▶ When a two-place divisor is a number such as 45 or 65, we round it off to the **next higher ten.**

Round off the divisors of these examples, and tell what the first quotient figure is. Then copy and work the examples.

	a	*b*	*c*	*d*	*e*
6.	$18\overline{)81}$	$17\overline{)80}$	$21\overline{)840}$	$28\overline{)92}$	$30\overline{)156}$
7.	$26\overline{)125}$	$28\overline{)100}$	$32\overline{)100}$	$36\overline{)200}$	$48\overline{)250}$
8.	$25\overline{)620}$	$49\overline{)300}$	$61\overline{)1835}$	$45\overline{)650}$	$70\overline{)510}$
9.	$55\overline{)300}$	$72\overline{)5114}$	$76\overline{)3474}$	$88\overline{)4782}$	$94\overline{)3486}$

10. Suppose you were to divide 60 by 21. You know that three 20's are 60. You know also that 3×21 is 63. You can see at once that there are only two 21's in 60. Does rounding off the divisor 21 to 20, or to the nearest 10, help you find the quotient? Copy and complete the example.

$$21\overline{)60}$$

Multiplication Helps You Divide

You need to multiply two-place numbers by one-place numbers when you use division. Tell or write the answers only to these multiplication examples.

	a	*b*	*c*	*d*	*e*	*f*
1.	36×4	27×2	30×7	45×5	48×4	52×5
2.	55×3	64×6	59×8	70×7	72×6	75×9
3.	73×2	79×4	82×7	85×9	88×9	96×8

More Help with Two-Place Divisors

Sometimes the estimated quotient is too large.

To find how many 34's there are in 295, first round off 34 to 30. Think: There are about as many 34's in 295 as there are 30's in 295. There are nine 3's in 29, so there are about nine 30's in 295. Write 9 in the quotient above the 5. $9 \times 34 = 306$. But 306 is larger than 295, so we must use a quotient figure smaller than 9. Try 8. $8 \times 34 = ?$ Copy and complete the example.

A

$34\overline{)2956}$ $34\overline{)2956}$ 8

272

Sometimes the estimated quotient figure is too small.

In Example B, round off 45 to 50. Think: There are about as many 45's in 426 as there are 50's in 426. There are eight 5's in 42, so there are about eight 50's in 426. Write 8 in the quotient above 6. $8 \times 45 = 360$. $426 - 360 = 66$. Since the remainder 66, is larger than 45, we know that there are more than eight 45's in 426. So we change the quotient figure to 9. $9 \times 45 = ?$ Copy and complete the example.

B

$45\overline{)4260}$ $45\overline{)4260}$ 9

405

21

Copy and work these examples:

	a	*b*	*c*	*d*	*e*	*f*
1.	$25\overline{)198}$	$33\overline{)295}$	$36\overline{)284}$	$26\overline{)180}$	$35\overline{)312}$	$24\overline{)180}$
2.	$35\overline{)200}$	$45\overline{)445}$	$25\overline{)200}$	$17\overline{)1295}$	$24\overline{)2250}$	$26\overline{)2580}$

Zeros in the Quotient

Examples **A** and **B** show you how to divide by two-figure divisors when there are zeros in the quotient.

How many 24's in 98? How many 24's in 21? What is the quotient? The remainder?

A

$$24\overline{)981}\quad 40,\ 96,\ 21$$

How many 25's in 75? How many 25's in 0? How many 25's in 8? What is the quotient for Example **B**? The remainder?

B

$$25\overline{)7508}\quad 300,\ 75,\ 08$$

1. How many divisions did you do in Example **A**? In Example **B**?
2. How many figures are there in each quotient in **A** and **B**?

▶ A figure must be written in the quotient for each division in the example.

Copy and work these examples:

	a	*b*	*c*	*d*	*e*	*f*
3.	$25\overline{)760}$	$20\overline{)800}$	$24\overline{)486}$	$32\overline{)1625}$	$30\overline{)300}$	$40\overline{)4000}$
4.	$20\overline{)6001}$	$25\overline{)2500}$	$40\overline{)8025}$	$18\overline{)7206}$	$24\overline{)9618}$	$50\overline{)15420}$

Practice with Two-Place Divisors

▶ Round off the divisor to the nearest ten to help find the quotient figure.

▶ Place the quotient figure above the last place to the right that is being used.

Copy and complete these examples. In the first row of examples the first quotient figures are placed correctly for you.

	a	*b*	*c*	*d*	*e*	*f*
	3	5	6	6	4	5
1.	$18\overline{)62}$	$24\overline{)125}$	$25\overline{)160}$	$28\overline{)175}$	$36\overline{)1512}$	$45\overline{)2285}$
2.	$17\overline{)75}$	$32\overline{)239}$	$30\overline{)920}$	$48\overline{)198}$	$27\overline{)1950}$	$52\overline{)3015}$
3.	$64\overline{)420}$	$59\overline{)502}$	$70\overline{)500}$	$72\overline{)457}$	$75\overline{)5200}$	$55\overline{)5665}$
4.	$73\overline{)190}$	$79\overline{)366}$	$82\overline{)594}$	$85\overline{)810}$	$88\overline{)1672}$	$96\overline{)7720}$

Dividing by Ten

A grocer has a 50-pound bag of potatoes. How many 10-pound bags can he fill from the 50-pound bag?

To find how many 10-pound bags can be filled from the 50-pound bag we need to find how many 10's there are in 50. We divide 50 by 10. There are as many 10's in 50 as there are 1's in 50. $50 \div 10 = 5$ We write the 5 in the quotient in ones' place because we are dividing ones. The grocer can fill 5 ten-pound bags.

A
$$10\overline{)50}\quad 5$$
$$50$$

Look at Example **B**. How many 10's in 67? Notice that the 6 in the quotient is in ones' place because we are dividing ones. Copy and complete the example. $67 \div 10 =$ ___?___ and ___?___ remaining.

B
$$10\overline{)67}\quad 6$$

C
$$10\overline{)894}\quad 8$$
$$80$$
$$9$$

How many 10's in 89? Since we are dividing 89 ones, we write the 8 in ones' place in the quotient. Copy and complete the example.

Why is the 3 in the quotient written above the zero in the dividend? How many 10's in 5? What is the quotient for Example **D**? The remainder?

D
$$10\overline{)305}\quad 30$$
$$30$$
$$5$$

Give each quotient and remainder orally:

a. $80 \div 10 = ?$ *b.* $53 \div 10 = ?$ *c.* $59 \div 10 = ?$ *d.* $75 \div 10 = ?$

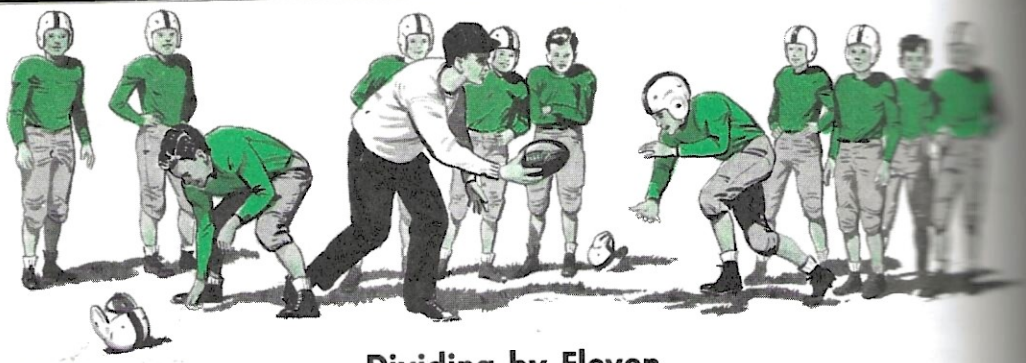
How many 10's are there in 30? 32? 38? 35? 40? 46? 52?

How many 10's are there in 10? 19? 20? 28? 60? 81? 95?

Copy these examples and divide. Check your work.

a	*b*	*c*	*d*	*e*	*f*
$10\overline{)80}$	$10\overline{)92}$	$10\overline{)120}$	$10\overline{)360}$	$10\overline{)750}$	$10\overline{)400}$
$10\overline{)238}$	$10\overline{)464}$	$10\overline{)876}$	$10\overline{)111}$	$10\overline{)935}$	$10\overline{)100}$
$10\overline{)2094}$	$10\overline{)209}$	$10\overline{)9760}$	$10\overline{)3000}$	$10\overline{)8020}$	$10\overline{)6005}$

In a test run an automobile went 230 miles on 10 gallons of gasoline. How many miles did the automobile average per gallon?



Dividing by Eleven

Eleven players make up a football team. How many teams does the coach have when 44 boys come for football practice?

To find the number of teams, we need to find how many 11's there are in 44, so we divide 44 by 11.

How many 11's are there in 44? How many teams does the coach have?

A

$$11\overline{)44}$$

4

44

Only 40 boys showed up for the second football practice. How many teams did the coach have that day? How many boys were left over?

B

$$11\overline{)40}$$

3

33

7

Check

11

× 3

33

7

40

1. How many 11's are there in 33? 22? 11? 66? 55? 44? 77? 99? 88?

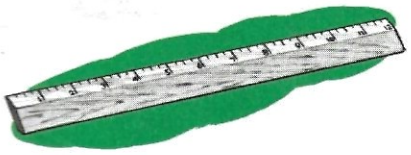
2. Make a table of 11's, from $1 \times 11 = 11$ to $9 \times 11 = 99$.

3. Give the number of 11's and the remainder in each of the numbers below. Remember that $9 \times 11 = 99$.

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*
4.	15	20	24	25	29	30	36	42	48
5.	56	70	81	92	100	102	108	105	109

Copy these examples and divide. Check your work.

	a	*b*	*c*	*d*	*e*	*f*
6.	$11\overline{)33}$	$11\overline{)79}$	$11\overline{)21}$	$11\overline{)90}$	$11\overline{)100}$	$11\overline{)106}$
7.	$11\overline{)253}$	$11\overline{)506}$	$11\overline{)121}$	$11\overline{)170}$	$11\overline{)445}$	$11\overline{)800}$
8.	$11\overline{)6813}$	$11\overline{)1052}$	$11\overline{)8904}$	$11\overline{)4518}$	$11\overline{)3310}$	$11\overline{)1000}$



Dividing by Twelve

Twelve is an important number. There are 12 things in one [illegible]. 12 inches in a foot, 12 months in a year, and 12 hours shown [illegible] clock face.

1. Name at least three different items that we buy by the dozen.
2. How many inches in 2 feet? In 3 feet? In 4 feet?
3. Dividing by 12 is easy if you know the multiplication table of 12's. Study this table until you can give the products without looking at the examples:

$1 \times 12 = 12$	$4 \times 12 = 48$	$7 \times 12 = 84$
$2 \times 12 = 24$	$5 \times 12 = 60$	$8 \times 12 = 96$
$3 \times 12 = 36$	$6 \times 12 = 72$	$9 \times 12 = 108$

4. Copy the example at the right. Use the multiplication table of 12's to help you do the division. Remember that six 12's are 72, and that seven 12's are 84. $12\overline{)830}$
5. What should be the first quotient figure? Multiply and then subtract. Be sure that the remainder is less than 12. Bring down the zero.
6. Decide what the next quotient figure should be and then complete the example. Check your answer.

Give the first quotient figure in each of these examples orally. Then copy the examples and divide. Check your work.

a	*b*	*c*	*d*	*e*	*f*
$12\overline{)48}$	$12\overline{)60}$	$12\overline{)84}$	$12\overline{)96}$	$12\overline{)108}$	$12\overline{)120}$
$12\overline{)54}$	$12\overline{)70}$	$12\overline{)95}$	$12\overline{)100}$	$12\overline{)145}$	$12\overline{)132}$
$12\overline{)144}$	$12\overline{)175}$	$12\overline{)200}$	$12\overline{)360}$	$12\overline{)705}$	$12\overline{)1728}$
$12\overline{)250}$	$12\overline{)600}$	$12\overline{)728}$	$12\overline{)4809}$	$12\overline{)5280}$	$12\overline{)10910}$

Dividing by Twelve and Thirteen

Dividing by 13 is also easy if you know how to divide by 12. Study the example at the right.

$$13\overline{)624}\quad \begin{array}{r} 48 \\ 52 \\ \hline 104 \\ 104 \\ \hline \end{array}$$

Five 12's are 60, but five 13's are 65, or five more than 60. Since 65 is larger than 62, we know that there are only four 13's in 62. So we write 4 in the quotient. $4 \times 13 = ?$ We subtract 52 from 62 and bring down the 4.

Since eight 12's are 96, we try 8 as the next quotient figure. Is 8 the correct figure? Check the answer.

1. Copy and work this example. $13\overline{)249}$

2. Divide each of these numbers by 12. Give the quotients and remainders orally.

65 72 70 74 84 83 88 96 95 109

3. Divide each number in Exercise **2** by 13.

▶ When the divisor is 13, remember to use 12 to help you estimate the quotient figure.

Give the first quotient figure for each of these examples orally. Then copy and divide the examples. Check your work.

	a	*b*	*c*	*d*	*e*	*f*
4.	$12\overline{)60}$	$13\overline{)72}$	$12\overline{)88}$	$13\overline{)85}$	$12\overline{)112}$	$13\overline{)115}$
5.	$12\overline{)276}$	$13\overline{)299}$	$12\overline{)470}$	$13\overline{)615}$	$12\overline{)720}$	$13\overline{)782}$
6.	$13\overline{)108}$	$12\overline{)100}$	$12\overline{)119}$	$13\overline{)125}$	$13\overline{)1046}$	$12\overline{)1200}$
7.	$12\overline{)111}$	$13\overline{)987}$	$12\overline{)1100}$	$12\overline{)6076}$	$13\overline{)4040}$	$13\overline{)11800}$

8. How many dozen oranges are 144 oranges?

9. A newspaper man was overseas 54 months. How many years was this?

★**10.** A baker made 82 tarts. How many "baker's dozens" did he make? (A "baker's dozen" is thirteen.)

Dividing by Fourteen, Fifteen, and Sixteen

Make a multiplication table of 15's from 1×15 to 9×15 to you use 15 as a divisor. Notice that every product ends with with 0.

Or write the products:

a	*b*	*c*	*d*	*e*	*f*	*g*
2×15	4×15	3×15	6×15	8×15	7×15	9×15
2×14	4×14	3×14	6×14	8×14	7×14	9×14
2×16	4×16	3×16	6×16	8×16	7×16	9×16

Three 16's are how much more than three 15's?

Three 14's are how much less than three 15's?

How many 15's are there in 45? How many 16's? 14's?

Five 16's are how much more than five 15's?

Five 14's are how much less than five 15's?

How many 15's are there in each of these numbers?

30	45	60	75	90	105	120	135
32	44	61	73	92	100	124	130

How many 15's are there in any number from 15 to 29? from 45 to 59?

Give the number of 14's in each number in Exercise **10.**

Give the number of 16's in each number in Exercise **10.**

When the divisor is 14 or 16, estimate the quotient by using as the divisor.

Copy these examples and divide. Check your work.

a	*b*	*c*	*d*	*e*	*f*
$15\overline{)60}$	$16\overline{)60}$	$14\overline{)60}$	$15\overline{)800}$	$16\overline{)800}$	$14\overline{)800}$
$15\overline{)90}$	$14\overline{)90}$	$16\overline{)90}$	$15\overline{)120}$	$14\overline{)120}$	$16\overline{)120}$
$15\overline{)450}$	$15\overline{)485}$	$15\overline{)9060}$	$15\overline{)1048}$	$15\overline{)1400}$	$15\overline{)6155}$
$15\overline{)960}$	$14\overline{)844}$	$16\overline{)1423}$	$14\overline{)1257}$	$16\overline{)1500}$	$14\overline{)1000}$

Dividing Money Numbers

Judy bought 4 packages of yarn at a sale. The sale price was 4 packages for $6.32. What was the cost of a package?

Think: Since 1 package costs one fourth as much as 4 packages, I will divide $6.32 by 4 to find the cost of 1 package.

The decimal point is placed in the quotient so that there are two figures to the right of it to show cents. The decimal point in the quotient is placed directly above the decimal point in the dividend.

A
$$4\overline{)\$6.32}\quad \$1.58$$

▶ When we have both dollars and cents in a number, the decimal point must be placed between the dollars and cents.

Copy and complete these examples. Place the decimal point in the correct position in each quotient. Check the answers.

	a	*b*	*c*	*d*	*e*
1.	$12\overline{)\$76.20}$ $\$\ 6\ 3$ 72 $4\ 2$	$4\overline{)\$1.68}$ $\$\ \ 4$ $1\ 6$ 8	$20\overline{)\$9.00}$ $\$\ \ 4$ $8\ 0$	$8\overline{)\$.40}$ $\$\ 0\ 5$	$3\overline{)\$}$

Copy the following examples and divide. Check your work.

	a	*b*	*c*	*d*	*e*
2.	$\$8.42 \div 2$	$\$.50 \div 5$	$\$.56 \div 4$	$\$.20 \div 5$	$\$.08 \div 2$
3.	$\$1.20 \div 2$	$\$1.50 \div 3$	$\$.75 \div 25$	$\$.40 \div 10$	$\$.36 \div 12$
4.	$4\overline{)\$.88}$	$3\overline{)\$.39}$	$4\overline{)\$.80}$	$5\overline{)\$.30}$	$6\overline{)\$1.80}$
5.	$8\overline{)\$.56}$	$4\overline{)\$9.76}$	$5\overline{)\$2.15}$	$4\overline{)\$12.08}$	$7\overline{)\$42.56}$
6.	$12\overline{)\$.96}$	$10\overline{)\$.80}$	$8\overline{)\$24.00}$	$16\overline{)\$48.00}$	$10\overline{)\$1.00}$
7.	$50\overline{)\$40.00}$	$5\overline{)\$125}$	$10\overline{)\$200}$	$25\overline{)\$9.75}$	$25\overline{)\$10.00}$

8. Is $\$5.08 \div 5$ about $.10 or $1.00?

9. Is $\$2.48 \div 10$ about $.25 or $25.00?

Another Way to Write Multiplication and Division Examples

Study Examples A and B to see how N is used to stand for a number in multiplication and division examples.

Example A is read, "Six times what number equals 24?"

A	$6 \times N = 24$
B	$12 \div N = 6$

In Example A, what number does N stand for?

Read Example B. N stands for what number in Example B?

In Examples 1 to 5 find what number N stands for.

	a	*b*	*c*	*d*
1.	$4 \times N = 32$	$N \times 3 = 18$	$20 \div N = 5$	$N \div 5 = 6$
2.	$7 \times 8 = N$	$63 \div 9 = N$	$6 \times N = 54$	$72 \div N = 8$
3.	$N \times 12 = 144$	$N \div 10 = 10$	$96 \div N = 12$	$50 \times N = 500$
4.	$5 \times N = 5$	$8 \times 0 = N$	$0 \div 6 = N$	$N \div 6 = 1$
5.	$N \div 10 = 100$	$15 \times N = 75$	$N \times 16 = 96$	$100 \div N = 20$

What Is the Number?

1. If 8 is multiplied by a certain number, the product is 144. What is the number?

2. What number subtracted from 60 leaves 39?

3. What number added to 64 gives a sum of 100?

4. Bob said, "I am thinking of a number. If I divide it by 12, I get a quotient of 10. What is the number?"

5. Joan said, "I am thinking of a number. If I subtract it from 500, I get 439." What is the number?"

6. Write a "number" question that uses addition to find the answer, one that uses subtraction to find the answer, one that uses multiplication to find the answer, and one that uses division to find the answer. Find the answers to your questions.

Help in Problem Solving

Tell or write how to find the answers to these questions.

1. If you know the cost of one dozen things, how do you find the cost of three dozen?

2. If you know the cost of five pounds of apples, how do you find the cost of one pound?

3. If you know the number of miles between two cities, and the time that it takes an automobile to travel from one city to the other, how do you find the average speed of the car?

4. If you know the number of ounces in one pound, how do you find the number of ounces in ten pounds?

5. If you know how much Mr. Dodd's hourly wage is, and the number of hours he works each week, how do you find his weekly wage?

6. If you know the total weight of the five members of the basketball team, how do you find their average weight?

Copy the following sentences and write the correct words or figures in place of the question marks.

7. If one gallon of gas costs 30¢, five gallons will cost ? times 30¢, or ?.

8. If you walk three miles each hour, in 4 hours you will walk ? ? 3 miles, or ? miles.

9. If ten pounds of sugar cost 80¢, one pound costs one ? of 80¢, or ? ¢.

10. If 4 boys earned $8.00 all together doing errands, the average amount earned was one ? of ?, or ?.

11. If 30 pupils gave 10¢ each, on the average, for the Red Cross, all together they gave ? ? 10¢, or ?.

★12. Don wishes to save $24 for his vacation. He earns $4.00 each week and he has an allowance of $2.00 each week. If he saves half the money that he receives, how many weeks are needed for him to save the $24?

How Well Can You Solve Problems

(Problem Test 2)

Read each problem carefully. Be sure that you know what the problem asks you to find. Decide how you should use the facts that are given to find the answer. Also decide whether each problem is a one-step or a two-step problem before you solve it.

1. If one quart of ice cream serves 6 children, how many quarts are needed to serve 48 children?

2. Katherine needs to buy 8 packages of gelatin for her birthday party. At 9¢ a package, can she buy the 8 packages with the half dollar and the quarter that she has in her purse?

3. When watermelon costs 8¢ a pound, how much must Mrs. Gibbs pay for a 28-pound watermelon?

4. The attendance at Central College basketball games for this season has been 1217, 704, 1009, and 2415. What was the average attendance for the season?

5. Joyce lighted 63 candles on her grandmother's birthday cake. Her grandmother blew out 24 candles the first time she tried, and 19 the second time. How many lighted candles remained?

6. Mr. Reed earns $480 per month. How much does he earn in one year?

7. Henry had $1.65. He bought six 25-cent Saving Stamps. How much of his money did he have left?

8. Dan has 16 marbles and Joe has three times as many. How many marbles do they have all together?

9. The Wilson's planned an automobile trip of about 1950 miles. To complete their trip in four days, about how many miles will they need to average per day?

10. Laura found that she could buy 4 quarts of ice cream for her party at $.80 a quart or one gallon for $3.00. How much could she save by buying the gallon?

11. A brief bag is on sale at $\frac{1}{4}$ off the regular price. The regular price is $6.00. What is the sale price?

Review of Unit 2

Copy these examples and divide:

	a	*b*	*c*	*d*	*e*
1.	$45 \div 9$	$54 \div 6$	$56 \div 7$	$63 \div 9$	$72 \div 8$
2.	$39 \div 4$	$50 \div 7$	$60 \div 8$	$75 \div 9$	$88 \div 9$
3.	$\frac{1}{2}$ of 50	$\frac{1}{4}$ of 72	$\frac{1}{6}$ of 360	$\frac{1}{8}$ of 800	$\frac{1}{10}$ of 100
4.	$8\overline{)56}$	$9\overline{)81}$	$7\overline{)61}$	$8\overline{)70}$	$9\overline{)89}$
5.	$3\overline{)120}$	$2\overline{)800}$	$5\overline{)405}$	$4\overline{)56}$	$6\overline{)468}$
6.	$8\overline{)100}$	$6\overline{)400}$	$3\overline{)152}$	$9\overline{)98}$	$8\overline{)647}$
7.	$6\overline{)3620}$	$7\overline{)2805}$	$10\overline{)405}$	$10\overline{)1000}$	$20\overline{)870}$
8.	$50\overline{)437}$	$18\overline{)79}$	$43\overline{)95}$	$24\overline{)200}$	$36\overline{)280}$
9.	$57\overline{)342}$	$23\overline{)150}$	$92\overline{)736}$	$35\overline{)2086}$	$48\overline{)4500}$
10.	$72\overline{)5000}$	$11\overline{)100}$	$12\overline{)118}$	$13\overline{)105}$	$15\overline{)105}$
11.	$16\overline{)125}$	$12\overline{)745}$	$11\overline{)444}$	$13\overline{)1040}$	$15\overline{)8500}$
12.	$4\overline{)\$4.80}$	$\$.50 \div 5$	$\$.09 \div 3$	$25\overline{)\$.75}$	$12\overline{)\$3.60}$

13. Is $\frac{1}{4}$ of 245 about 6, 60, or 600? Is $\frac{1}{5}$ of 980 about 2, 20, or 200?

14. Is $\frac{1}{3}$ of \$.67 about 2¢ or 20¢? Is $\frac{1}{4}$ of \$1.50 about 4¢ or 40¢?

15. Write the numbers from 1 to 75 that contain 8 an even number of times.

16. Write the whole numbers that contain 7 eight times but not nine times.

17. *a.* $40 \div ? = 4$. *b.* $60 \div N = 5$. What number does N stand for?

18. How many nickels does it take to make \$.75?

19. How many 7-cent tickets could Joe buy for the school carnival with 45 cents?

20. Dick worked 6 hours on Saturday and earned \$4.50. What was his average pay per hour?

How Much Have You Learned?

(Chapter Test 2)

Find the answer in column *b* for each example in column *a*.

a	*b*	*a*	*b*
1. How many 7's in 42	54	**6.** $27 \div 6$	$2.10
2. The quotient of $35 \div 7$	2	**7.** 21×50 is about	100
3. The product of 9×6	96	**8.** $412 \div 4$ is about	$3.60
4. Divide 20 by 10.	6	**9.** $3 \times \$1.20$	1000
5. Multiply 8 by 12.	5	**10.** $\$8.40 \div 4$	4 and 3 remaining

11. Give the multiplication and division family for 8, 9, and 72.

12. Give a multiplication example that means the same as this example: $6 + 6 + 6 + 6 + 6 = 30$

Tell the answers:

	a	*b*	*c*	*d*	*e*	*f*
13.	0×5	5×7	6×9	9×8	20×6	300×5
14.	12×4	2×13	3×14	15×5	2×17	25×5
15.	$42 \div 7$	$46 \div 6$	$66 \div 3$	$270 \div 9$	$150 \div 15$	$180 \div 60$
16.	$\frac{1}{2}$ of 100	$\frac{1}{4}$ of 120	$\frac{1}{9}$ of 90	$\frac{1}{8}$ of 400	$\frac{1}{10}$ of 650	$\frac{1}{12}$ of 240

17. The product of any number and zero equals __?__.

18. Zero divided by any number equals __?__.

19. Divide each of these numbers by 10: 70; 98; 140

20. Divide each of these numbers by 11: 48; 77; 90

21. *a.* Find $\frac{1}{3}$ of $.69 *b.* $\frac{1}{5}$ of $5.20 *c.* $\frac{1}{4}$ of $1.44 = ?

22. Find the cost of one pencil if three pencils cost $.18.

23. If Larry pays $1.20 each year for dues in the Boys' Club, how much are his dues for one month?

24. What number does N stand for? *a.* $4 \times 25 = N$
b. $72 \div N = 8$ *c.* $N \div 25 = 4$ *d.* $12 \times 12 = N$

25. How many sandwiches and how many pears are needed for 6 boys if each boy is to have 3 sandwiches and 2 pears?

How Much Have You Learned?

(Chapter Test 2—continued)

Written

1. How much are eight 6's? Seven 9's? Nine 8's?
2. How many 7's are there in 42? 8's in 59? 9's in 86?

Copy and do these examples:

	a	*b*	*c*	*d*	*e*	*f*
3.	3×32	$70 \div 2$	8×40	$85 \div 3$	812×4	$800 \div 4$
4.	$\frac{1}{4}$ of 96	$\frac{1}{6}$ of 60	$\frac{1}{8}$ of 360	$\frac{1}{9}$ of 603	$\frac{1}{10}$ of 200	$\frac{1}{8}$ of 5280
5.	59×6	745×8	32×24	38×54	469×58	867×679
6.	400×5	203×7	96×50	308×400	415×208	600×40
7.	$8\overline{)789}$	$7\overline{)426}$	$9\overline{)3658}$	$4\overline{)2001}$	$40\overline{)298}$	$18\overline{)1500}$
8.	$29\overline{)900}$	$48\overline{)6849}$	$76\overline{)6045}$	$13\overline{)1178}$	$11\overline{)1000}$	$16\overline{)6412}$
9.	100×10	$1000 \div 10$	1000×360	$5000 \div 50$	$2000 \div 2$	101×100
10.	$6 \times \$.39$	$\$.56 \div 7$	$50 \times \$2.80$	$\$6.48 \div 12$	$10 \times \$.80$	$\$5.00 \div 10$

11. Find N: *a*. $84 \div N = 7$ *b*. $N \times 15 = 150$ *c*. $42 \div 12 = N$
12. *a*. Which gives the larger product, 5×394 or 15×394?
    b. How many times as large?
13. Does $\$3.95 \div 10$ equal about \$4.00, \$.40, or \$.04?
14. Does $12 \times \$4.90$ equal about \$60, \$.60, or \$.06?
15. Mr. Latch owns a dog kennel. He buys 115 pounds of meat each week for his 23 dogs. Each dog eats an average of how many pounds of meat per week?
16. A tire cost \$13.35. Find the cost of four of these tires.
17. The manager of a baseball team paid \$278.60 for 20 suits. What was the price of one suit?
18. How many dozen oranges are in a box of 288 oranges?
19. Mr. Higgins paid \$4.50 for 15 gallons of gasoline. What was the cost per gallon?
20. Kay bought a loaf of bread for 22¢ and three quarts of milk at 19¢ a quart. What change should she receive from a \$1 bill?

How Well Do You Understand Numbers?

(Enrichment)

1. In the number 555, the first 5 at the left stands for how many times as much as the last 5 at the right?

2. In the number 804, the 8 stands for how many times as much as the 4?

3. In the number 408, the 4 stands for how many times as much as the 8?

4. Write the answer only to this example. The product of 15 × 48 is how much less than the product of 15 × 48?

5. What number multiplied by 9 gives a product of 108?

6. What number divided by 16 gives a quotient of 16?

7. What number divided by 12 gives a quotient of 10 with a remainder of 10?

8. Does 6 × 24 equal the sum of 6 × 20 and 6 × 4?

9. 4 × 225 equals 4 × 200 plus 4 × __?__

10. The product of 102 × 18 is how much more than the product of 100 × 18?

11. Does 840 ÷ 10 equal the sum of 800 ÷ 10 and 40 ÷ 10?

12. Write the answer only for this example. 13,230 ÷ 378 = 35. How much is 13,230 ÷ 35?

13. What number is contained in 150 twelve times with a remainder of 6?

Find the Missing Figures

Find the missing figures in each example:

a. 46
×?7
230
?2
1?10

b. 3?
×?6
?04
6?
???

c. ?9
?)47?
4?
5?
??

d. 8?
??)19??
??4
6?
6?

THE WORLD OF NUMBERS

CARPENTER | PEPPER